



KASHMIR
ECOLOGY
AND
ENVIRONMENT

NEW CONCERNS AND STRATEGIES

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ecology

and

ENVIRONMENT

NEW CONCERNS AND STRATEGIES

Culture and Heritage of Kashmir KECSS Research Series VI

KASHMIR ECOLOGY AND ENVIRONMENT

NEW CONCERNS AND STRATEGIES

Edited by

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Dedicated

1. To the people of Kashmir whose love and care for the environment and the multi-cultural heritage (Kashmiriat) of Kashmir is unlimited.
2. To Dr. T.N. Khoshoo for his services in the field of environmental sciences, including his Presidential Address to the Indian Science Congress in 1986 on "Environmental Priorities and Sustainable Development in India".
3. To poet G.A. Mehjoor for his inspiring poetry, including his poem "Walu ha bag bano nav baharuk shan pada kar". Come O Gardener, create a new consciousness of spring—which is a theme song for the environment movement world over, and in Kashmir.
4. To Barbara Ward and Rene Dubos for their book *Only One Earth, the Report to United Nations 1st Conference on Human Environment, 1972, at Stockholm*.

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Preface

The Kashmir Education, Culture and Science Society (KECSS) is an academic and research institution known world over for its contributions to studies on Kashmir's heritage and scholarship. Kashmir has been a renowned seat of learning in history, and has produced literature and books by outstanding scholars like Abhinav Gupta, Kalhana, Lal Ded, and in recent period by a large number of scholars like Gulam Ahmed Mehjoor, Dina Nath Nadim, Dr. B.N. Pandit, Prof. Rehman Rahi, Dr. S.S. Toshkhani, Prof. J.L. Kaul, Prof. Nitya Nand Shastri et. al.

The KECSS has held seminars in last few years on some thought-provoking subjects, that are of interest to world community in general, and especially to people of Kashmir. This seminar held on 8th November 2003 in New Delhi analysed some very important aspects of concern to all—"the ecology and environment of Kashmir" that need to be managed well for a better future life of the people of Kashmir. It was an interdisciplinary effort. It included participation of scientists, economists, lawyers, historians and educationists from reputed institutions like Jawaharlal Nehru University, Kashmir University, Delhi University, Jamia Milia Islamia, Jamia Hamdard, Indian Law Institute, KECSS et. al. We are thankful to ICSSR who provided a financial grant for the seminar. The seminar was largely attended. It provided ideas which need to be worked upon by policy makers, and people in general. The proceedings and papers should be of general interest to educationists and the public. It is expected to promote better life for people and harmony with nature. We are thankful to executive members of KECSS and particularly to Mr. J.L. Bhatt, the General-Secretary,

and Mr. Vinod Kaul, the Treasurer for providing excellent arrangements for the seminar. The views expressed in this book are those of the authors, the Editor and KECSS are not responsible for any errors or omissions.

Prof. S. Bhatt

Honorary Prof. JNU,

Convenor of Seminar and

Editor of Proceedings

New Delhi,

1st December, 2003

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Part I

INAUGURAL SESSION

INAUGURAL SESSION

Part I

Introduction: About the Seminar

PROF. S. BHATT

The major purpose of this seminar is to analyse environmental problems of Kashmir, and suggest measures for environment protection and sustainable development. Like in other States in India, Kashmir has seen a deterioration of natural environments in recent years. Thus we have pollution of air in large towns of Kashmir resulting in poor health standards for people. Water pollution is causing great concern. Garbage disposal is another major issue of environments. Water reservoirs like beautiful Dal Lake, Wular Lake are facing problems of encroachment and may further reduce in size if not protected. Kashmir has its own mountain ecology which is being subject to much stress and strain. Use of technology and population increase has spoiled a large part of land and biodiversity resources. The forests need new management for regeneration and protection. Above all, a new vision is needed for planning of eco-cities where the ecology of various geographical areas remains stable and yields more natural products. Sustainable development is a new worldwide concept for eco-management of natural resources. Biotechnology has brought forth new tools for sustainable development.

Indeed we see a new unity and theory of science developing in biological sciences. Leading scientists like, Professor Ilya Prigogine and others have called for a new dialogue with nature. In his book *Order Out of Chaos*, Prigogine talks of a new science philosophy, a new synthesis and unity in science which help us understand "disorder, instability, diversity, disequilibrium and non-linear relationships" in nature. The nature, he says, has its own ordering capacity. Entropy is important for evolution. And there are some unifying trends in science, amidst the diversity of nature.

In the environmental sciences we have also the trend to see knowledge in totality. Thus Rabindranath Tagore's unity in diversity

is seen alongside Prigogine's order out of chaos. The latter has recommended this concept of Tagore as modern science is moving towards this direction.

Thus we have a new hope for mankind to grasp this revolution of science and humanities. This interaction of all disciplines for a new unity of science is important to realize. The global environment movement is based on this concept. The present writer and a distinguished scientist, Dr. B.D. Nagchaudhri, have tried to explain this evolution of mankind in our book - *The Global Environment Movement, a New Hope for Mankind*, 1987. Establishing harmony with nature is one major goal of mankind. Promoting harmony in a multi-cultural world is another goal of the environment movement. Sustainable development based on eco-management of resources and on gross natural project are all emerging issues for mankind to follow.

The seminar held by KECSS has therefore many ideas to promote in the land of Kashmir. The seers and sages of Kashmir knew the concepts of harmony with nature and harmony among people in a multi-cultural, multi-religious society. Seers like Lal Ded, Nund Rishi and poets Mehjoor, Nadim among many have defined these ideas in what is now called *Kashmiriat*—the philosophy of living of Kashmiri people. Modern science is now available to develop what UNESCO has said "partnership with nature". Nature is not to be exploited. Understanding the secrets of nature will help us to realize greater partnership, and therefore development. Austerity is yet another goal of modern development; Gandhi is important to follow in ecological economics.

The chapters that follow deal with some major issues of environments by leading scholars. We may not have dealt with all the important areas of environment because of limitation of time. Yet, we hope we have been able to set-up a trend to examine all issues in a holistic manner, and locate the inter-relationship between various issues. Thus environment impact assessment is an urgent task for all ministries for the State Government. Peoples' participation is also of utmost concern for the management of environments. Environment awareness and education is to be communicated to the masses, and to the younger generation. Above all, people have to realize the limits of population growth. Malthus had warned in the 18th century on the population issue,

as food could not last long. Modern science has provided food, but we may run short of space for living. The impact on overall ecology of Kashmir due to unlimited population growth can be profound. Militancy is partly caused by people who have no work to do. Therefore harmony with the ecology of Kashmir should be a leading concern for the people of Kashmir. Recommendations of this seminar given towards the end should be useful to the government and the public institutions for framing new policies.

The chapters that follow will help unfold a new enthusiasm, new knowledge for managing Kashmir environments with a new perspective. It should inspire the younger generation in particular to adopt new science and technology for sustainable development, and promote harmony with nature and in society.

Address by Mr. M.K. Kaw*

Environmental Protection and Sustainable Development in Kashmir: Some Lessons from Himachal Pradesh

It is my pleasant duty to welcome you all to this National Seminar on Environmental Protection and Sustainable Development in Kashmir, organized by the Kashmir Education, Culture and Science Society, with financial assistance from the Indian Council of Social Science Research.

In the KECSS, we have been focusing in different seminars on different aspects of Kashmir. Seminars held in the recent past have concentrated on the future of Kashmiri Pandits, contributions made by eminent Kashmiris to science, the position of Kashmiri women down the ages, the condition of women and children among the Kashmiri migrants, the interface between Kashmiri and Urdu, the contribution of saints and sages to the composite culture of Kashmir and so on. Many of these have resulted in or are about to result in books. All the effort that has gone into these ventures has naturally resulted in a veritable ferment of intellectual activity among the Kashmiris located in the Capital.

In today's Seminar which was originally proposed to be held in Srinagar and was shifted to Delhi only because the situation in the valley did not move fast enough towards normalcy, we hope to shift the focus to the Kashmir valley. I know that most of my friends are likely to focus on the situation in Kashmir. My acquaintance with Kashmir has been somewhat casual, while I

* Chairman, KECSS, IAS retired and formerly Education Secretary, Govt. of India, currently chairman, Managing Committee, Regional Engineering College, Srinagar, Kashmir. Address : D-31, Pamposh Enclave, New Delhi-110048, Mr. M.K. Kaw has recently edited a widely-circulated book by KECSS—*Kashmir and Its People : The Evolution of Kashmiri Society*, 2004.

have spent a considerable part of my working life in the State of Himachal Pradesh. I would, therefore, like to state in a few minutes what the experience of Himachal has been. Perhaps there are some lessons for the planners and administrators of Kashmir in this.

When we look at the development scenarios of the two contiguous States of J&K and Himachal Pradesh, one is quite struck both by the similarities and the differences. There is much that is similar in terms of area, population, topography, hilly terrain, riverine systems and large water bodies, a simple and unassuming people in the rural areas, the emphasis on horticulture, the music and dance and so on.

If we analyse, carefully, Kashmir was ahead of Himachal in most of the areas of development in 1947. Over the decades, lot of money was pumped by the Central Government in both sensitive Border States. But the general impression is that Himachal has gone ahead, while J&K has got bogged down in a morass of political chicanery, administrative bungling, rampant corruption, phenomenal ineptitude and absence of a cohesive polity.

If you talk to any politician or bureaucrat from Kashmir, he is quick to point out the problems faced by the State in fighting the terrorist incursions during the last 14 years. This may be a classic example of the cause being diagnosed as the result. The economic stalemate in Kashmir has not been caused by its political vicissitudes. It is the politics that has resulted from the arid economic landscape.

From the environmental perspective, both States are located in the Himalayan region. The Himalayas are among the most recent and vulnerable mountain ranges in the world. We have to be extremely careful about how we exploit the natural resources of this region.

First and foremost, we have to look at the policy of afforestation and its implementation. In this respect, there is not much that can be said to the credit of either State. Taking into account the extreme poverty of the people and the slim possibilities of industrialization, all the energies of politicians and bureaucrats have been concentrated on finding ways and means of denuding the mountains of whatever little cover they had. Much of the illicit

wealth in the two states has emanated from forest lessees, who have shared their spoils with the other corrupt elements.

In this process, the policy of afforestation has been very faulty in Himachal. The traditional approach has been to grow departmental nurseries of pine and deodar, which take decades to grow and just a brief half an hour to fell. At one stage, there was a shift towards three-dimensional forest farming, so that species would cater to all the three objectives of providing forest cover to the slopes, supplying fruit and timber to the right holders and growing fodder for the cattle. There was also a welcome change in the attitude of the Forest Department from being a protector of the State-owned forests to becoming an equal partner with the people for protection and preservation of community forests. I may be out of date, but while I was in service, the satellite pictures did not corroborate the claims of the forest department that the area or density of forest cover had increased as a result of their efforts.

The policy of the forest departments in relation to minor forest produce has been equally regressive. Throughout India, the forest departments have disturbed the age-old symbiotic relationship between the tribals and their habitat. The result is that the tribal has also been forced to join the other looters of the forest by extracting the various types of roots and fruits for a paltry sum, thereby destroying the rich biodiversity for which the Indian jungle has been so justly famous since the days of Rudyard Kipling.

I would touch very briefly on the success story of Himachal in the field of horticulture. There was a time when Kashmir was synonymous with apple. Today, when you buy apple anywhere in the Indian sub-continent, more often than not you are buying the Himachal apple. Himachal has outstripped Kashmir in terms of both quantity and quality of apple, the production of apple juice and concentrate. You find HPMC juice bars in bus stands, railway platforms, airports and other public places. All this has happened in a very compact time frame as a result of some clear policy initiatives.

And when we speak of horticulture, there has been development in a multitudinous fashion. It has overtaken the orange, the kinu, the olive, mushrooms, apricot, plum, almonds

and walnut. The result has been a vast increase in incomes. Himachal, which used to supply most of the *mundoos* to the cities and towns of Northern India today provides employment to thousands of migrant labourers from Bihar, Rajasthan, Nepal, Kashmir and Tibet.

Let us take the area of tourism. In 1947, Himachal had nothing, while the Srinagars, Pahalgams, Gulmargs, Mughal Gardens and the rest of places of tourist importance in Kashmir were legendary and world-famous. The whole world called Kashmir the Switzerland of the East.

Over the years, the position has been reversed. There was a time when there were no water bodies in Himachal like the Dal, the Wular, the Nagin and so on. Today, Himachal can boast of a number of water bodies, including man-made ones. Each hydroelectric project is creating a water body. There were no ski slopes; today there are several. Water sports are flourishing in all the rivers and lakes. Huge tourist complexes have been built all over. The tourist industry is bursting at the seams.

The position in Kashmir is dismal. Most of the water bodies are getting choked. The famous floating gardens have disappeared. The Dal has become a dirty septic tank for the houseboats. Much of the lake front has been built upon. The Jhelum is a pale shadow of its former self. Tourism is in shambles. The entire part of the economy that was dependent on tourism is in dire straits. This includes the shikarwallahs, the houseboat owners, the hoteliers, the waiters, the ponymen, the shopkeepers and so on. It is not only the security situation that has scared away the tourists. The overall environmental degradation is also largely responsible.

At the end, I would like to refer to the pollution that has overtaken the minds of some of our brethren in the valley. The pollution of fundamentalism, fanaticism and bigotry is the worst pollution that can afflict us. Gone are the days when all the communities enjoyed a cohesive relationship and lived in harmony with one another. Thus had been erected the mighty edifice of Kashmiriyat, which stood for eclecticism, tolerance and celebration of diversity. Recent events, however, give us hope for the future. It seems that the fever is subsiding and better days are about to begin. If this happens, we can become a beacon-light to the entire world of what UNESCO refers to as the art of living together.

Thank you, ladies and gentlemen. Jai Hind!

Inaugural Address by Dr. D.K. Biswas

Kashmir Ecology and Environments : New Concerns and Strategies

President of the KECSS, Mr. M.K. Kaw, Vice-President KECSS Prof. Dhar, Prof. Bhatt, the Convener of the seminar and old colleagues of mine. I also see some old faces (Mr. Swatantra) and several others and the members of the society and dwellers of the Pamposh Colony.

As lotus symbolizes many good things in life so does environment. A number of initiatives and steps are required for making environment better. For example, we see in the city of Delhi—which was one of the most polluted cities in the world, the largest eco-friendly bus fleet (DTC) in the world. A number of other countries are now in touch with India to know how they have brought about this change in air quality. Of course, it needs a lot of hardships and tough decisions to create a mindset for making better environment along with sustainable development.

In that context I find this seminar is very timely and positive one, particularly, the timing is good as far as Delhi is concerned—weather-wise, climate-wise and beautiful surroundings around us.

Talking about environment issues in Kashmir—the sustainable development in the valley of Kashmir, I am reminded of the famous couplet about—

If there is heaven on earth

It is here. It is here. It is here.

This is how Kashmir was described that if there is place where heavenly atmosphere prevails, it is in Kashmir, it is one of

* Until recently Chairman, Central Pollution Control Board, Government of India. Address : 40/14, C. R. Park, New Delhi-110019.

the best examples of how the nature is found and protected in its original way.

There are number of environmental problems in the valley particularly in terms of water bodies. The valley of Kashmir is surrounded by a number of water bodies particularly high altitude lakes; each of them having unique topography and significance—which are not found everywhere in the world. Not even in Switzerland. There are other wetlands also (e.g. floating gardens) which are special to Kashmir valley only. Not necessarily only the Dal Lake which of course is the most important one as far as the Srinagar city is concerned but there are also other huge water bodies. It is so important and a lifeline of the inhabitants here but also for the purpose of sustainable development which can be seen as the best ecosystem on which we can build up the concepts of sustainable development. Prof. Swatantra knows about it as Chairman of PCB, how much problem the Dal Lake is facing. I remember in my earlier days in Kashmir when Dr. V. Kaul used to be at the Kashmir University I would jokingly say to him that the number of Ph.D thesis you have produced on pollution of Dal Lake is inversely proportional to the amount of pollution and the shrinkage that these water bodies are experiencing. And there are number of projects at various stages which have been taken up to protect the Kashmir environment, but unfortunately the results are not as expected. I remember during my stint with PHE, the English Department of Kashmir University was asked to prepare an action plan, and the urgency was so much that it had to be done tomorrow if not yesterday and everyone of us worked on it and Planning Commission provided funds for it. The action plan was prepared with a great speed. After that, as always happens in India, we start all good things with much fanfare and then slow down. The same thing happened that our energy spirits died out over a period of time—the same thing has happened in case of Dal Lake. Again recently I found on television where a government official was announcing that they have prepared another action plan in which they are expecting the Government of India to provide 70% grant while 30% will be borne out by the State Government. The new action plan will work for the removal of organic wastes and weeds and the rehabilitation of houseboat dwellers. It will also take care of the waste material/sewage treatment of the discharge from hotels around the Dal.

Like we feel proud about Taj so should we feel about Dal. If you want to protect Dal you will have to take care of it. Over a period of time in spite of so many projects and action plans being taken up and so many thesis being produced the things have not improved. Obviously there is something else which is required and probably one of the most important things that is required is the creation of a positive mindset or mobilization of public opinion of people active and eco-friendly influence in the valley. This can be done by the intellectuals—the people like you, who can influence many things and create awareness in the people of the valley. Environmental proposal should be realistic and people friendly as well. For example the houseboat dwellers of Dal Lake are saying that they were told that they would be rehabilitated elsewhere but nothing concrete has been done so far. Rehabilitation proposals and packages should be realistic in the sense that they should be people friendly as well as eco-friendly.

These are some of the issues of economic importance which need to be closely linked to environment or to sustainable development. You cannot be oblivious of the need to basically manage environment and meet the aspirations of the people of that area. Unless we do that we will talk in terms of plans and not about realistic goals. That is the kind of role we have to play—what can be achieved in what time frame and how best all of us can work towards realizing these goals? We should not forecast the options of future in our goals. Sustainable development is possible and we can certainly attain that.

I once again thank you for inviting me here and would like to reiterate that if at any point of time I will be of any help to you people I shall be glad enough to lend my helping hand.

Thank you very much.

Like a lot of good about I do should we feel about Dal

If you want to protect Dal you will have to take care of it. It is a good idea to have in mind of so many people and a good thing being taken up and so many things being done the thing here is improved. Obviously there is something the world is required and probably one of the most important things that is required is the creation of a positive attitude of mind in the people. The can be done by the people and the people here you and can influence many things and create awareness in the people of the value of environmental protection should be realized and people realize as well for example the importance of the Lake and as for the new way to be told that there would be a revolution in the world but nothing concrete but just a new way to be told that they should be people should be told in the same way that they should be people should be told as well as you already know.

I have seen some of the things of economic development which need to be closely linked to environment as a development. You cannot be oblivious of the things of the environment and must be aware of the things of the environment and must be aware of the things of the environment. I think we do not we will take in the things of the environment. That is the kind of things of the environment that can be achieved in what time frame and in what time frame we work towards reaching these goals. We should be aware of the things of the environment in the things of the environment. We should be aware of the things of the environment and we can certainly attain that.

So I think again thank you for having the time and would like to return that if at any point of time I will be of any help to you people I shall be glad enough to lend my helping hand.

Thank you very much

CHAPTER 1

Bal Lake, Sriharipur : Environmental Issues and Conservation Strategy

Prof. D.P. Zunker*

Part II (Pre-lunch Session)

PRESENTATION OF PAPERS

It is now believed that Bal Lake is about 3500 years old having been formed as a result of subsidence and shrinking of an ancient glacially-fed lake. When around the valley during the glacial period. The presence of lower and upper "Balraon" or different parts of the valley floor which support the existence of a glacial lake (Zunker, 1985).

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Part II (Pro-Inch Session)

PRESIDENTIAL OF PAPERS

CHAPTER 1

Dal Lake, Srinagar : Environmental Issues and Conservation Strategy

PROF. D.P. ZUTSHI*

Dal Lake is situated at an altitude of 1583 m to the northeast of Srinagar, the summer capital of Jammu and Kashmir State. The lake has been the centre of "Kashmiri" civilization since the times of King Ashoka (250 BC).

Dal is a shallow, multi-basin lake with an area of about 18 sq. km., out of which open water area is not more than 11 sq. km. It has both, the inflow and the outflow water channels and is classified as a drainage lake resembling more to a flow through system rather than a quiescent water body. Recent estimates show that each year about 166 million cubic metre of water flow into the ecosystem out of which 149 mi cu m leave the lake through the two outflow channels, 5.6 mi cu m are drawn for drinking purposes and the rest is lost through evapotranspiration, seepage and suction dredging (Zutshi and Yousuf, 2000).

It is now believed that Dal Lake is about 50,000 years old having been formed as a result of desiccation and shrinking of an ancient oligotrophic lake, which covered the valley during the pleistocene times. The presence of lower and upper "Karewa" in different parts of the valley lend sufficient support to the existence of a primeval lake (Agrawal, 1988).

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One of the significant features of Dal Lake is its vast and diverse catchment, which spreads over an area of about 337 sq. km. Dachigam-Telbal in the northeast comprise nearly 70% of the catchment, its other segments are Zabarwan mountains and parts of Srinagar city.

Over the years, urbanization, land-use changes, sedimentation, release of solid and liquid wastes from houseboats, human settlements, hotels, flow of fertilizers and pesticides from the catchment and encroachment of the lake area have resulted in environmental issues, which may be very difficult to resolve. Besides supporting tourism, Dal Lake is also important for fishery, vegetable cultivation, drinking water, food and fodder plants and aquatic sport. The lake is an important repository of unique biological diversity.

The important environmental problems facing the Dal Lake are:

- (i) Changes in hydrology including water flow pattern
- (ii) Flow of large quantities of wastes
- (iii) Sedimentation and siltation
- (iv) Shrinkage in lake area
- (v) Reduction in water depth
- (vi) Water quality deterioration
- (vii) Conversion of water into floating gardens
- (viii) Proliferation of aquatic plants
- (ix) Loss of biological diversity
- (x) Impact of houseboats
- (xi) Continuing encroachment on lake area

Dal Lake has low water detention period coupled with high flushing rate that acts as a buffer against inflow of large quantities of waste water. In recent years there has been progressive decrease in the inflow of fresh water from the catchment consequently, the self-cleansing mechanism of the system is under great stress. The abstraction of water for agriculture has virtually starved the lake especially during low precipitation periods. Creation of numerous obstructions to the natural flow of water have resulted in numerous stagnant areas, which support excessive macro-vegetation, presenting an ugly look. The backwaters are highly polluted as

there is hardly any surface movement. In the past the flowing waters of these areas used to be adored by the tourists.

Earlier it was estimated that 46.3 tons of phosphorous and 634 tons of nitrogen are drained in the lake every year from the surrounding area, out of which 40.8 tons of land 545.1 tons of leave the lake every year resulting in a positive balance of 5.5 tons of P and 88.9 tons of N, which remains within the sediment. Recent studies have, however, shown that there is significant increase in the P inflow, which is now 156.62 tons per year. This is a clear indication of cultural eutrophication.

It is well known that large quantities of silt flowing into the lake through Telbal Nallah originate from the highly eroded Dara-Danihama catchment. As a result, the northern basin is partly filled reducing its useful age. The present silt load to the lake is 60877 tons per year (Zutshi and Yousuf, 2000).

For the unplanned expansion of Srinagar City towards its western shores, a large portion of the lake has been filled and converted into built area. A map of Dal Lake prepared in 1858-59 by Major Montgomery shows water spread of 25 sq. km. that is now reduced by more than half. Unfortunately, there is no restriction on illegal encroachment of the lake area and if this state of affairs continues unchecked soon there will be no open water area left. The reduction of water depth due to siltation and sinking of plant debris has reduced water volume and impacted thermal stability.

Long-term changes in the water quality clearly indicate the extent of enrichment due to inflow of untreated sewage and wastewater. During the past twenty years, there has been manifold increase in the electric conductivity, phosphates, nitrates and ammonia. The water quality of inshore areas has deteriorated in comparison to offshore areas. The Secchi transparency has registered significant reduction as a result of biogenic and non-biogenic turbidity (Zutshi, 2003).

One of the serious threats to Dal Lake environment is the presence of floating gardens. Over the years these gardens or islands have reduced the lake area, modified hydrology especially the flow pattern of water and increased pollution levels of

surrounding channels. It is not exactly known when and under what conditions these man-made floating islands started appearing in the lake. During 15th century, floating islands were already being used for vegetable cultivation. However, the cultivators were prevented to expand their fields beyond certain areas demarcated for this purpose by Sultan Zain-ul-Abdin. It is only in recent decades that their spread has assumed alarming dimensions. Present estimates indicate that more than 500 ha of floating islands are under vegetable cultivation and more than 40,000 people live in hamlets constructed on non-floating islands. Although under J & K Land and Revenue Act of 1939, Section 133B it is an offence to convert lake water into built area yet everyday new floating islands are created reducing open water area. Lavish use of fertilizers and pesticides to enhance vegetable production on floating islands is a matter of serious concern (Gopal, Zutshi and Chet, 2003).

Aquatic vegetation is an important component of Dal Lake ecosystem. The submerged vegetation release considerable quantities of oxygen during day time, part of which is used for oxidation of organic matter and a part for respiration of biological life. However, during recent time's prolific growth of aquatic plants have caused hindrance in fishing, swimming, boating and in the movement of boats.

Significant changes have been observed in the biological diversity of Dal Lake, e.g., there is progressive decline in the population of snow trout, a native fish species. Since 1934 the number of Chara species have reduced from 12 to 3, only a few isolated plants of Euryale are now present in the lake, Ceratophyllum has developed dense stands obstructing growth of other species, presence of water hyacinth in back waters is a cause for alarm, rapid increase of invasive species such as Salvinia natans and Nymphaea mexicana is interfering with the growth of native species, frequent occurrence of Euglena pedunculata blooms imparting red colour to the lake water is a serious problem.

Although houseboats have become an inseparable part of Dal Lake, they add nearly 20% of the pollution load especially during high tourist season. The houseboat area suffers from water quality deterioration, high incidence of microbial population,

excessive weed growth and putrefying smell. The water movement in this area is virtually non-existent resulting in anoxic conditions. The dark water area underneath houseboats is not conducive for biological life. The houseboat owners have filled lake area to lay flower gardens and construct residential hamlets.

Over the years the local people who compete against each other to obtain maximum gains without realizing the long-term consequences have grossly exploited Dal Lake as a resource common. The lake is now much smaller in area, it is shallow with much reduced water volume, its biological population is under stress, the lake is not receiving minimum dependable water flow needed for the survival of biological life especially, during dry summers, the pollution levels are much higher and illegal encroachment continue unabated. The useful life of Hazratbal basin is reported to be 150-200 years and that of Nagin basin 200-300 years (AHEC 2000).

In 1977, the state government invited a team of consultants from New Zealand (Enex), to look into the problem of pollution in Dal Lake and recommend suitable strategy for the conservation of the ecosystem. The project report was submitted in 1978. Outlining following conservation measures: reforestation of the catchment to reduce erosion, construction of a settling basin close to Telbal inflow channel to arrest silt from entering the lake, construction of northern foreshore road, dredging of sediments, deweeding of vegetation using machines, rearrangement of houseboats to improve water circulation, provision of sewage system and formation of State Corporation to supervise conservation and management of the lake.

To implement the recommendations the state government created a new engineering department, UEED. A high powered board was constituted to give directions to the UEED and monitor its functioning. Interestingly the state government did not stop at that but invited different groups of consultants and/or consultancy firms at regular intervals to prepare new project reports. Expert committees were constituted to discuss the lake conservation issues and a couple of new departments were created. In 1997, the Jammu and Kashmir Lakes and Waterways Development Authority was created, a board of directors with the Chief Minister

as its Chairman was constituted to periodically review the working of the Lake Authority. In the following year, a PFR under NLCP of the Ministry of Environment and Forests, Government of India was prepared, which incorporated many proposals contained in earlier reports. In the meantime, project cost kept on increasing. Recently yet another DPR on the conservation and management of Dal Lake has been prepared by the Roorkee University (now IIT) and submitted to the state government for implementation.

Despite the fact that during the past 25 years more than 12 project reports have been prepared on the conservation of Dal Lake, about 106 crore of rupees spent on various engineering works and an independent Lake Authority created, there is hardly any improvement in the lake environment. It would perhaps be of some interest to quote from the observations of Prof. R. Riddell of Cambridge University. He writes, "the Dal Lake project is essentially a consulting engineers appraisal, containing engineering proposal for engineering projects to be carried out project-by-project by engineers. There is no evidence to show that any pre-project evaluation; project ranking or any progress monitoring was undertaken. The funds spent on capital works have only limited beneficial effect upon the all-important land use and water purity problems. It is major failing that consideration of low cost managerial order took second place to issues of a high cost technical kind. It is highly desirable that limited expenditure on more purposeful and less costly measures are undertaken."

For the success of any conservation plan for Dal Lake it is absolutely essential to have political will, which has been lacking so far. It is also important to develop complete co-ordination between various government agencies. The full use of existing knowledge should be made and the staff that monitors the ecosystem should be fully trained. There is also need to integrate management policies into planning process. Application of multi-disciplinary approach is of paramount importance.

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CHAPTER 2

Environment and some Hydroelectric Projects in Kashmir

DR. S. BHOWMIK*

Since 1998 to 2002 I visited Kashmir every year mainly for monitoring the implementation of conditions stipulated at the time of granting environmental clearance to Uri hydroelectric project. In addition to this project also visited the proposed sites of Kishenganga hydroelectric project at Gurez Valley, Pakal-Dul and Bursar Hydroelectric project in Kishtwar district and Chutak Hydroelectric project in Leh. By this process I have seen the negative impact of these projects on ecology and the efforts to recoup the damages.

Kashmir being a mountainous area is blessed with a number of perennial streams and rivers, such as—Chenab, Indus, Jhelum, Suru, Shyok, Zaskar etc. Among all the rivers Chenab and Jhelum have the maximum hydro potential. Despite hydroelectric project being recognised as most economical and renewable source of electricity, yet its development in the state is not satisfactory. The main factors responsible for the slow speed of hydro power development are :-

- (i) Resource crunch.
- (ii) Submergence of Forest and Agricultural Land.
- (iii) Law and Order situation.

Out of these three factors environment related problems comes up from submergence of forest and agricultural land.

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Submergence of forest land leads to loss of biodiversity, habitat destruction of wild animals etc. Submergence of agricultural land as well as dwelling require rehabilitation of project oustees. When a hydroelectric project is accorded environmental clearance these issues are kept in mind and accordingly conditions are imposed. The other environmental related issues are catchment area treatment, migration of fishes, restoration of construction area including dumping site of excavated materials at dam site which require levelling, filling up of burrow pits, landscaping etc. All these conditions were stipulated in the environmental clearance letter of Uri hydroelectric project.

Uri hydroelectric project is a run of the river scheme across river Jhelum and is situated in district Baramulla of J & K state. The project consists of a 28 m high barrage, cut and cover, desilting basin, open channel, 10.63 kms long head race tunnel, 2 Nos pressure shafts, an underground power house and 2.00 kms long tailrace tunnel.

During my visits I found the project area has a digged topography with lofty ridges trending generally in NW - SE to W direction, ranging in elevation from 1200 m to 3500 m. The hill slopes are generally stable and covered with thick Deodar (*Cedrus deodara*) and pine forests. As most of the works done are underground, the landscape of the project area remained unaffected. However, due to the excavation done for various open as well as underground structures the total quantity of earth work generated was about 55 lac cu m. These excavated materials were dumped at different designated locations which were known as 'spoil tips'.

The waste material dumped at spoil tips comprised mainly loose rock fragments which had been mechanically compacted and properly levelled with suitable safe slopes. NHPC took great care to restore these areas. In order to restore these areas they formulated a work plan for revegetation of these spoil tips through "Integrated Biotechnological Approach". During 1998 when I first visited these sites I was surprised to see the plantations on solid rocks. The survival of these plants are example of dedicated work of Dr. Sahid Ali Khan of NHPC, Mian Javed Husein, the then Deputy Conservator of Forests and his team. The procedure

followed for developing, this plantation I learned from them which I am describing below:

- (i) Since most of the dumped material comprised compact rock material of quartzitic, metavolcanic, shale rock the physical and chemical properties were evaluated to know their nutrient value.. The dumped materials were tested for pH, electrical conductivity, organic carbon, organic matter, total NPK and available NPK, exchangeable and total micro-nutrients viz. Pb, Cr, Cu, Mn, Fe, Ni, Cd, Zn.
- (ii) As in most cases, the material was rocky and deprived of soil, little quantity of soil was used before plantation. To develop rhizosphere, appropriate blends of organic waste and soil were mixed. The soil was also tested for its physical and chemical characteristics. Apple peel was used as organic waste as it was found that apple peel was more fertile in terms of organic carbon than farm yard manure.
- (iii) Isolation and screening of specialised strains of Mycorrhizal fungi, Rhizobium, Azotobacter and Phosphate solubilizers (biofertilizer inoculum) were done for the spoil tips. Plants were inoculated with specific biofertilizers and mycorrhizal strains. Periodically rhizosphere development for physical, chemical and microbiological parameters were evaluated, (mass culture of plant specific biofertilizers and mycorrhizal fungi were procured from NEERI and Regional Research Laboratory, Jammu.
- (iv) Plantation of saplings was carried out in pits in plain area of spoil tips using identified blend and biofertilizer inoculum. The size of each pit was 0.6 m× 0.6 m. The excavated material from the pits was mixed with 43.2 litre of external soil, 10 kg of apple peel and 5 kg of farm yard manure. The pit was refilled with the mixture, 10-15 gm of mycorrhizal inoculum near the root system. Thereafter, the plant saplings already inoculated with biofertilizers (Rhizobium and Azotobacter) was planted and refilling was done to cover the entire plant root system.
- (v) Suitable plant species of high ecological and economic value which are adaptable to local conditions were selected for plantation. The major plant species are—

<i>Non-leguminous</i>	<i>Leguminous</i>
Populus sp. Salix alba,	Robinia psuedoacacia
Cedrus deodara, Pinus	Ailanthus excelsa,
Wallichina, Prunus sp.	Indigofera pulchela
Ulmus wallichiana.	

Turfing (sodding) and suitable shrubs and grasses were also grown at slopes. Irrigation facilities were provided for achieving quick greenery. A children's park (over 0.4 hec.) is also developed on the dumping ground at Buniyar.

There were 12 spoil tips. The plantation work could not be taken up in all the spoil tips. As some of them were taken over by army for putting their canons. These sites were exempted from fulfilling the condition i.e. plantation of trees.

For five years I have monitored this project and have seen the growth of these plantations. The effort of the staffs of NHPC and forest department (Uri CAT) of Jammu and Kashmir are commendable. I have monitored several River Valley projects in different parts of this country, but no where I have seen plantation on solid rocks. As Kashmir is known as paradise of earth, probably for maintaining that heavenly view the project authority made sincere effort for this plantation. In that way this is an unique example.

I visited some other sites of Kashmir which were proposed for setting up of hydroelectric projects (HEP). These are Kishenganga HEP, located at Gurez valley, Pakal-Dul and Bursar HEP in Kishtwar district and Baramulla district.

Uri-II hydroelectric project (280 MW) is planned for construction of a barrage on Jhelum river immediately downstream of the tailrace outlet of the existing Uri-I HE project. Total land requirement for the project is 300 hectare; Out of that 150 ha. is forest land. Density of the forest is 0.4. During site visit it was seen that the forest is totally degraded. Scattered trees like *Pinus wallichiana*, *Populus Sp*, *Rubinia pseudoacacia*, *Salix alba* etc. are mainly available. The nature of forest is temperate in nature. Wildlife are rare in the project area due to degraded forest and frequent firing from POK. However, existence of few rare and endangered species like Markhor, Leopard and Muskdeer have

been reported within 7 km. The project is located in gorge of mountains. No villages will be submerged. Migratory fishes like *Schizothorax* species are present in the river. Fish ladder has been proposed so that fish can easily migrate upstream/downstream for spawning purpose.

From the barrage, 2.4 km long head race tunnel will be constructed. The underground powerhouse will come up in the right bank of the river to accommodate 4 units of 70 MW capacity each. 9.1 km tailrace tunnel will pass under the river and will join on its left bank near Urusa village adjacent to LOC. From the above it may be seen that except barrage, almost all the component of the project is underground and therefore creating minimum disturbance to the ecology.

Chutak HEP (18 MW) is a run of the river scheme on river Suru, located in district Kargil. It was seen that the proposed site for head works is on right bank of river Suru near village Sarchey about 17 km from Kargil. A small barrage of 90 m in length will be constructed on this spot. Elevation of the riverbed is 2775 m. and elevation of road level is 2784 m. FRL will be at 2783 m. Length of pondage would be about 700 m. Water will be always below 1 m of road level. Snow carp a migratory fish is available in the river.

On the right bank some trees are there. Left bank is totally barren. 4.5 km diversion tunnel would be constructed from head-work to Stickchey village, where an underground powerhouse will be constructed to generate 4×4.5 MW power.

From prima facie information, no house of any of the villages will be affected. Ladak region is cold desert. Except river bed no where any plant or even grass can be seen. Exception is Stickchey village. Where some water is available on the slope of the hill, villagers have planted some populus and willow trees on this slope.

About 131.25 ha land would be required for this project. No forest land (there is no forest) is involved. Only Government and private land is involved. Survey and investigation is at primary stage. At present there is erratic power supply and that also after evening there is no power supply. Room heaters are run by gas. Once the quantity of oxygen is reduced inside the room the gas

burners are automatically stops. When this power project will come up the people of this region will be able to keep their houses warm throughout the day and night.

The proposed site of Pakal-Dul and Bursar are on the river Marusudar. I visited this proposed site during July 2001.

Before going for site visit, I was informed that there is a National Park adjacent to project site named Kishtwar high altitude National Park. However, there is a dispute about declaration of the National Park while issuing the notification, objections of public residing in the area were not invited. Therefore rights and concession to the people were not considered before issuing the notification. Objections received from the inhabitants of the area with regard to declaration of National Park in Kishtwar is being considered by the competent authority. Due to these objections out of 425 sq.km. area of the National Park, less than 200 sq km has been taken into possession. Boundary of this area is more than seven km. away from the submergence area.

Pakal-Dul HEP (1000 MW) is a run off the river scheme. About 75 hec. of total land will be required for this project. Out of that 65 hec. is forest land. The site was surveyed from helicopter as no approach road is available from Kishtwar. Distance from Kishtwar to project site is about 20 km. Only mule track is available. SDM, Shri Khursheed, during discussion informed that the local people are anxiously waiting for the project. Because, if the project work starts then road network will have to be developed and by that way they will be benefited for their movement. During 'reki' it was seen that the site is located in a narrow valley flanked by steep and practically vertical hills on both the sides. Few huts could be located there. Vegetation on both sides of the river are degraded in nature. Vegetation is more on the higher altitudes of the hills. From helicopter except Pine other trees could not be identified. However, during discussion with the DFO's, they informed most of the species near reservoir side are *Cedrus deodara*, *Indigofera sp.*, *Salix sp.*, *Aesulus indica* etc. and none of them are rare or endangered species. Wildlife Warden informed us that musk deer and common leopard which are schedule-I animal are available in higher reaches of the area. As human habitation are there on the river bank, generally they do not come down. In view of the above it is felt that the proposed

site may not have any significant impact on the surrounding environment.

The site of Bursar HEP (1020 MW) is couple of km upstream from Pakal Dul-site. The project is planned for construction of a 252 m high rock fill dam at Hanzal to generate $4 \times 255 \text{ MW} = 1020 \text{ MW}$ hydropower on BOT basis. The proposal was earlier investigated by CWC. About 4233.71 ha area will be required for this project. Out of that 438.31 ha is forest land, 900 ha irrigated and 2895.40 ha unirrigated land. Further about 7412 persons belonging to 1060 families of 10 villages are likely to be affected and would require resettlement and rehabilitation.

During aerial survey it was seen that the proposed dam is located almost in a V-shaped gorge with comparatively steeper side of the slope. The Kishtwar area lies "seismic Zone-IV" of seismic zoning map of India incorporated in Indian Standard Criteria for Earthquake Resistibility Design of Structures (IS-1893:1970). Earthquake occur frequently around Kishtwar area. However, it was noted that movements resulting from fractures at depths of about 40 km are responsible for most of the major earthquakes of engineering significance. The maximum magnitude of earthquake in the past was 6.5 on Richter scale. Keeping in view the high seismicity of the area, the sites specific seismic design parameters and micro-earthquake studies for the project shall be got done from Department of Earthquake Engineering, University of Roorkee and got approved by the Standing Committee of CWC.

No rare or endangered species of flora have been reported in the area. The vegetations are same as mentioned for Pakul-Dul project. As regards aquatic fauna, some important species like Mahaseer are reported in the rivers and its nallas. As the dam will be rock filled in nature it is difficult to provide fish ladder for migration. This issue was discussed with project authority and the I was informed that a hatchery will be created for developing fish-ling which will be ultimately released upstream and downstream of the dam for maintaining the fish population.

Regarding rehabilitation of the project affected persons the SDM Shri Khursheed Bhat had informed that the state government, will provide suitable land for resettlement of the project affected persons. The affected people are happy to leave that place as there

is no road available for transportation. He also said that the package will be provided as per the approved plan of State Government and Central Government 20 km new road net work has to be built which will pass through the forest area. Forest Conservation Act (1980) of Government of India is not applicable to J&K. The forest clearance has to be obtained by the project authority from the state government. The Divisional Forest Officers who were present during discussion and site visit informed that there will be no problem for getting the forest clearance.

The proposed sites of Kishenganga HEP (330 MW) is located in Bandipora and Gurez Tehsils of Baramula district. The project envisages construction of a 77 m high concrete dam about 100 m upstream of Malik (Kadal) bridge on Kishenganga river in Gurez valley, diverting the water through a 22 km long head race tunnel and an underground power house near village Kralpora (Bandipora) with an installed capacity of 330 MW with three of Baramula district of Jammu and Kashmir State. The project envisages construction of a 77 m units of 110 MW each. The tail race tunnel of 2 km length will take the tail water of bonar nalla which ultimately drops into Wular lake and by this way, will augment the water supply to Lower Jhelum Hydroelectric project and Uri HEP.

The proposed dam site is connected by 60 km all weather road from Srinagar to Bandipora and 72 km fair wheather road from Bandipora to Dam site (Gurez). The power house will be located in Kralpora (Bindipora) which is about one km from main road (at a distance of about 67 km from Srinagar). Kachcha wide road is existing for going to power house site. The colony for staffs of the power house will come up on the private land opposite to the main road of power house. About 0.4 ha. forest area located about 6 km away (towards srinagar) from power house has been identified for explosive storage. DFO informed that as per record 67 fully matured trees are to be removed for this purpose. The project authority has been advised to shift the explosive storage area to non-forest area.

Kishenganga river originates some where in higher reaches in Drass area of Kargil district (J&K). This river is a major tributary of river Jhelum. At the tail-end of the reservoir the river is joined by Burzil nallah from the right bank. Down stream of the confluence

the river has cut a "U" shaped valley - Gurez Valley. This valley is about 20 km long and about 2.5 to 3 km wide, the gradient is moderate to gentle and it meanders amidst wide low level terrace on either bank. These terraces are partly under cultivation and settlements.

The valley remain under 1.5 m snow for eight months (October to May) and temperature goes down to 20°C during winter. The existing inhabitants, who are going to be affected due to the construction of the project are poor and leading a hard and tough life. The soils of agricultural lands are not of good quality. The main agriculture produce are potato, maize and local pulses. The population are depended on cattle farming and small business. Major portion of the population are dependent on Army for food and medicine supply. The line of control (border with POK) is about five km from the Gurez valley.

Ten villages are located in the valley. Out of which eight villages will be submerged. The name of these villages are:-

1. Badwan 2. Wanpora 3. Khandigal 4. Fakirpora 5. Mastan 6. Khapuri 7. Dawar 8. Markut.

The full reservoir level is fixed at El. 2431 m. At this level a small portion (about 4%) of Achura village will come under submergence. No habitation of this village will be affected.

The tenth village is Charwan which is fully unaffected. The total population of the affected villages is about 10,000. These people will be resettled either in Talel valley or Bandipora. The local people are interested to leave the place due to harsh winter.

During the visit it was seen that the vegetation pattern in the Gurez Valley/region shows a marked variety. Hardly about 25% of the area is covered by forest trees and the rest of the area is either covered by alpine pastures or by bare hill slopes. Most of the southern belt running along the right bank of Kishenganga river is sparsely covered with tree. The valley is located in high mountain ranges, which rises to more than 2400 m on both the banks over most of its stretches. The growth and density of trees are more on left bank side of river. Majority of the trees are fir (*Abies pindrow*) Kail (*Pinus wallichiana*) and Junipers (*Juniperus recurva*). The density of trees up to the height of submerged area is not significant. The density is more on upper side of the hill,

beyond the submergence level. About 15 ha of forest area will be submerged. DFO of the area informed that forest clearance will be issued by the State Government.

During discussion it was learnt that the catchment area of the project lies in Greater Himalayas. The catchment of Kishenganga river up to proposed dam site is 1815 sq km out of which 740 sq km fall above 4000 m of attitude and is permanently covered with snow. Some portion of catchment fall in Pakistan Occupied Kashmir. The reservoir rim area needs various biological and engineering treatment for soil conservation. About 16 km of the existing road from Malik bridge to Gurez Valley will be submerged. A new road has to be constructed for linking the rest of the area. The alignment of new road has not yet finalised, however it will pass through forest area.

The underground power house is proposed to be located on the left bank of Bonar nallah in village Kralpora. The entire power house will be underground. The area has a rock cover of about 380 m. The staff colony will come up on private land.

After considering all the issues it was felt that from environmental point the project may come up, if the project authority follow the following conditions:

1. The area required for storing explosives should not be forest area.
2. Socio-economic study of PAPs should be done. As J&K State does not have state government approved rehabilitation and resettlement package, the project authority may formulate the package based in draft National Rehabilitation Policy, 1998.
3. Yearwise catchment area treatment plan including reservoir rim treatment should be marked on an index map. The nature of degradation of catchment on Burzil Nallah in Pak Occupied Kashmir, may be indicated (if possible).
4. Dumping areas for excavated material of 23 km long head race tunnel should be identified and plan for restoration of the dumping area should be proposed. The method applied for restoration of dumping area in respect of Uri Hydro electric project may be followed.
5. Staff colony near power house is proposed on private agricultural land. Non-agricultural land may be explored for this purpose.

All the above mentioned projects are central sector project and likely project authority will be National Hydroelectric Power Corporation. The total capacity of these projects is 2648 MW. As per government policy from central sector projects 12% power is given free to the concerned States where these projects are installed. By that way Jammu and Kashmir will get about 318 MW electricity free of cost which will increase the revenue of the state, as well as locals will be benefited in terms of improved infrastructure and employment generation.

CHAPTER 3

Can We Ever Manage Solid Wastes?

DR. MS. IQBAL MALIK

Managing solid wastes is a major challenge for the developing world. The vast population and the underdeveloped economy further compounded the problem. It is evident from the visible garbage in our towns and cities that solid wastes are being ill managed. The legal dumps overflow and the illegal dumps in the by-lanes, parks and the roadsides are on the rise. It is my estimate that at least eight per cent of India's landmass, having lost its utility and fertility, has become a wasteland due to open garbage dumps.

In Indian climatic conditions garbage left unattended for eight to twelve hours is capable of giving birth to microbes-enough in number to spread infectious diseases like plague, cholera, tuberculosis, jaundice etc. According to WHO, every year 50-lakh people die due to such diseases. The unmanaged garbage also leaves behind a tale of civic woes like clogged drains and sewers and uncontrollable emissions of toxic gases.

Urban Indians produce an estimated 100,000 tons of wastes per day. According to GREEN report (GREEN, 1997) Indian population is estimated to increase to 1750 million by 2050 out of which 52 per cent will reside in urban areas. The solid waste generated then will be around 300 million tons. If the present methods of centralised garbage management and disposal are continued then the area under landfill would need to be around seven times greater than that used today. However due to population

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pressures and competing demand for land the already land starved urban areas will find it difficult to spare such large tracts of land. Thus we need to rethink the strategy followed for solid waste management and its disposal in our country.

In most cities and towns the procedure followed for management of municipal solid wastes is basically similar. Collection, transportation and disposal are the three basic steps followed. The garbage is brought to the community bins either by the householders, workforce employed by the individual houses or community or from common areas by municipal sweepers. All types of unsorted and unsegregated wastes are dumped in these bins. From the bins garbage is supposed to be picked up at a prescribed interval of time - once a week or every alternate day by the municipal trucks and transported to the different landfill sites.

According to the government a small percentage of the garbage is sent to some treatment facility for example biodegradable waste is taken to a composting site or the unsegregated waste is taken to some thermal-processing unit. The local waste pickers, who rummage through the bins and the landfills in search of any saleable recyclable waste, undertake whatever little segregation that takes place. The focus of the centralised system is on picking the visible garbage and transporting it for dumping at a landfill site. This by no means can be termed as garbage management.

Delhi as an Example

Though there is not a single city in the country where every bit of the garbage generated on a particular day is cleared, amongst the metros Delhi is worst. Of Delhi's total population of fourteen million, 60 per cent live in 500 authorised residential colonies and around an equal number in unauthorised colonies. About 40 per cent of Delhi's population lives in slums. Every year a city as big as Chandigarh is added to Delhi.

On an average, each citizen produces about half a kg of garbage daily; this results in production of a colossal 7500 metric tons of garbage per day and an estimated 28000 to 35000 metric tons of garbage every week.

Delhi's land area is being silently smothered by household garbage. There are around 5000 open garbage dumps, which keep gaining in volume and height everyday. As a result of this indiscriminate dumping an estimated more than eight per cent of Delhi's landmass has degenerated into a wasteland in an already land starved capital. Along with the detrimental effect on an otherwise fertile soil, the dumps are an environmental hazard.

The Government agencies responsible for keeping Delhi garbage free are Municipal Corporation of Delhi (area managed 1400 sq. km), New Delhi Municipal Council (area managed 40 sq km) and Cantonment Board (40 sq km).

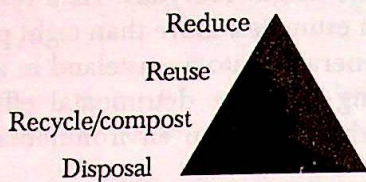
All these agencies follow a centralised approach. Thousands of people have been employed to sweep the colonies, collect the garbage from community bins and transport it to the landfill areas. Crores of rupees are spent for the upkeep of the heavy machinery and the pay of the employees whose only work is to transfer the waste. That also is not done efficiently because of poor work ethics and improper distribution of the work force leading to insufficient number of workers in many areas, thus despite all this expenditure at least 40% of the garbage produced does not get cleared everyday.

Total waste per day	7500 metric tons
Taken to landfill sites	3850 metric tons
Picked by rag pickers	1500 metric tons
Uncleared waste	2700 metric tons

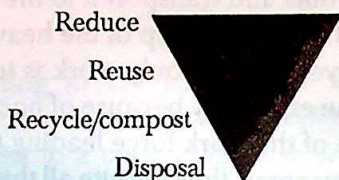
Problems with the Centralised Approach

There are three major flaws with the government's present garbage management system. Waste is simply transposed from place to place, the process doesn't involve communities and the prevalent laws do not lead to reduction in quantum of garbage being produced at source or control the type of garbage being produced. These problems arise because of a flawed conceptualisation of the waste hierarchy, the lack of clarity in the waste cycle and absence of stringent laws to regulate the type of waste produced.

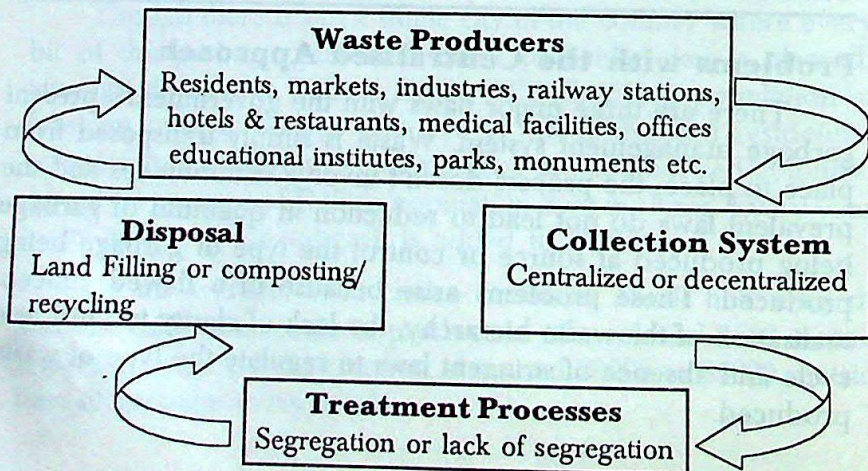
The flawed waste hierarchy means that maximum amount of waste is disposed at the landfill sites while very little emphasis is laid on the reduction, reuse, recycling/composting of the waste.



However actually the hierarchy of waste should be inverted whereby the amount of waste generated should be reduced at the source, all possible attempts should be made to reuse the waste as far as possible with emphasis on recycling and composting resulting in a very small amount of waste reaching the landfills.



The waste cycle comprising of producers, collection systems, treatment processors, and disposal techniques is also not clearly classified and thus there is chaos. As there is no clarity at the conceptual stage wrong practices are followed at every step of the cycle creating waste management problems. A correct waste cycle should clearly elucidate the various components involved at each different step as illustrated below.



In recent times the Municipal agencies, as well as, the Delhi government have started some new efforts to clean Delhi. Delhi Government's Bhagidari scheme was launched to create an interlace between the citizens and the government for better living condition in the city. The concept of Bhagidari aims to decentralise governance and bring about cooperation between the public and the government. However in practice things are different.

The problem with the scheme arose because

1. Registered Residential Welfare Associations, a prerequisite for joining Bhagidari, are not present in all colonies.
2. As Bhagidari means money from the government it has lead to fissioning of the RWA's in certain colonies dividing the area into small regions. At times the faction with the support of a few households but with a President who has contacts gets more attention at the excuse of the quieter faction with more support actually doing the work.
3. Joining Bhagidari means that individuals can gain instant prominence, they invite the Chief Minister to inaugurate schemes in their colonies, which soon fizzled out and are forgotten.
4. Bhagidari constituted cooperation at all possible levels from paying bills to water harvesting and waste management. This lead to too much of chaos. There should have been clear-cut division from the start regarding what is community work and what is the government's work.

Due to inherent flaws in the Bhagidari scheme and people's greedy attitude, Bhagidari could not deliver the required results.

The MCD meanwhile introduced the concept of two bins aimed at encouraging segregation at the individual household level. Money was collected from the residents of localities where the scheme was to be implemented for providing two plastic bins. For the colonies massive green and blue containers were provided free of cost. However past experience in certain localities, where such efforts were undertaken sometime back, has shown that twin bins in no way ensure that segregation takes place. Most householders use the bins for storage and other purpose rather than for disposing garbage. The blue and green containers placed at many strategic locations in the colonies have simply increased the number of garbage dumps in the colony. While initially the

garbage was confined and spread around the dhalovs now it is spread around the containers also.

Recently the government launched a much-hyped 'Cleanliness Drive'. Banners were put in various parts of the city and marches organised to clean the city. However nothing changed. The garbage bins are still overflowing and the drive like the many before it has yielded no results. This time too it was not clear what the government expected to achieve from such an exercise. Even if the exercise was aimed at creating awareness and motivating people into action one wonders how could it be achieved without showing tangible results. Drives and marches are one-time shows, which achieve almost nothing. Bringing in newer and more expensive equipment and introducing changes from the top also cannot ameliorate the garbage problem.

The drives can be better received if firstly the areas are cleaned. The residents are given a glimpse of how the area would look if it were neat and clean. Then the people could be motivated to accept their part of the responsibility and maintain the cleanliness.

Considering how the government's centralised approach has failed to achieve any results it is becoming increasingly evident that community based decentralised system may be a way out of the mess. Community involvement is no longer an option but is a necessity.

The need is to look at options that are indigenous, inexpensive and employment generating, which with the help of the concerned communities would usher in 'zero garbage' areas and localities.

One such resident friendly, scientific, eco-friendly and *decentralised garbage management scheme* is the Cleaning Brigade scheme of the NGO Vatavaran.

Cleaning Brigade Scheme being labour intensive is employment generating. It doesn't require heavy equipment or landfill sites for waste management. It is a self-sustaining scheme needing minimal initial investment. The members of the Cleaning Brigade are given regular orientation; they have work ethics and are proud of the results they achieve. Community participation, involvement of the resident associations and daily monitoring by nodal residents are integral to the success of the Cleaning Brigade.

After its launch in Asian Games Village in 1992, the Cleaning Brigade scheme extended its network to many sectors of Vasant Kunj, Noida and Jawaharlal Nehru University Campus in 1993-94. Till 1999 it was managing garbage for around 14 lakh people of 29 colonies in Delhi.

The Cleaning Brigade scheme operates along very simple lines. As and when the people of a colony/institute/market become sensitive to the garbage strewn in their immediate environment, despite repeated appeals to the civic agencies, they contact Vatavaran. Vatavaran's team of field workers surveys the area and studies the quantum and type of garbage produced. Based on the findings the composition of the Cleaning Brigade is decided, a patch of wasteland for composting selected, and the local rag pickers and unemployed youth recruited and trained to collect, transport and segregate garbage in an organised manner.

The Resident Welfare Association (RWA) asks all residents to join the scheme, buys uniforms, gloves and caps for the team and three-wheeled cycle rickshaws for transporting garbage. During various pre-launch meetings people are explained the working of the scheme and urged to start lining the bins and keep two bins to segregate garbage. One or more nodal residents are selected to liaise between the Cleaning Brigade and the residents.

The Cleaning Brigades pick up garbage from house to house at the nominal rate of Rs. 50 per month/house. The RWA helps the supervisor collect this monthly payment. The garbage collected is segregated on the rickshaws itself. The non-biodegradables are disposed of through recycling system. Biodegradables are composted through the pit system. The manure produced is sold for Rs. 2 per kg. The money thus generated is used for maintenance of the equipment and for giving gifts to the workers. Compost pits are suitably maintained and landscaped to make them aesthetically appealing and acceptable to the residents.

The results achieved by the Cleaning Brigades are for all to see. With minimal financial investment the Cleaning Brigades are turning the concept of 'zero garbage' areas into a reality. The schemes have created responsible citizens actively involved in managing their waste and have also made a difference to the lives of the socially and economically unprivileged by providing them with a constant income and above all a sense of dignity.

I strongly believe that for 'zero garbage cities' to become a reality, the basic units of the city (residential colony/ institute/ market/office/hotel etc.) would have to learn to manage their garbage by creating decentralised units like Vatavaran's Cleaning Brigades.

For any city/town/locality to become cleaner changes are required both in the government's approach and the citizen's attitude towards garbage management. Let us consider some of the changes that need to be brought about in the responsibilities of the government and the citizens.

Government's Responsibility

The government will have to undertake the following steps:

1 Changing the laws.

- Announcing tax-based incentives for people to make them responsible for the garbage they produce.
- Making it mandatory for the medical facilities to also manage their biodegradable waste along with the biomedical waste.
- Making it mandatory for hotels and restaurants to manage their solid wastes either through wormi-composting or energy generation technologies.
- Announcing incentives for the construction industry to utilise malba for construction purposes. Announcing awards for residential colonies, which utilise all the malba produced within the colony.
- Announcing malba points in the city—areas, which need inert waste like malba. Areas where malba can be deposited or collected for reuse. Areas near construction industries that agree to process and utilise malba for construction purposes.
- Enforcing differential sales tax on various types of packaging. Total ban on use of non-recyclable packaging materials.
- Regulating the packaging industry by making it mandatory to have 'buy back' schemes or/and use only pre-selected items of pre-selected size for packaging.
- Providing subsidy for use of reusable glass bottles for cold drinks and water, recycled paper, jute, khadi, terracotta and other eco-friendly packaging.

- Encouraging use of recycled materials by imposing heavy taxes on virgin raw materials.
 - Reorganising the existing unorganised shanty-recycling units into collective with common pollution control devices.
- No illegal unit should be allowed to come up.
2. Compiling a list of NGOs/ CBOs/ RWAs/ or NGIs working on socially relevant issue at the grassroots level in the area and forming a network to cover the entire city.
 3. Dividing the city into regions. Setting up regional committees to fix realistic targets of cleanliness and follow it rigorously. Asking all those NGOs/ CBOs/ RWAs and NGIs working in fields other than waste management to incorporate waste management in their sphere of activity.
 4. Training NGOs, CBOs, RWAs, NGIs, municipal employees and other such personnel about the different types of wastes, their production patterns, segregation and methods of management including formation of waste management brigades.
 5. Dividing each region into 1-km zones with detailed maps showing the location of one or more of the following areas. The VIP areas. Embassies, Offices, Parks, Hotels, Medical facilities, Educational institutes, Residential colonies, Markets, etc.
 6. In the VIP areas, embassies, offices and parks the management of the solid wastes should be handled by the municipal employees who have already been trained to collect, segregate and compost biodegradables and dispose of the recyclables.
 7. All medical facilities are already required to manage their biomedical waste either themselves or through common facilities because of an existing law. This law should also incorporate the management of biodegradables by the medical facility.
 8. Educational institutes must have a strong component on education related to solid wastes. Students should be taught the five R's of waste management – **Reject** (plastic carry bags, disposable plastic glasses etc.), **Reduce** (tetrapacks, plastic bottles etc.), **Reuse** (typed paper sheets, plastic bottles etc.), **Replace** (ball pens with fountain pens, foils with cloth napkin, plastic bags with cloth bags) and **Recycle** (the biodegradables through composting and sending non-

biodegradables for recycling). Cleanliness committees should be formed incorporating NGOs, students and teachers/administrative staff to work towards making educational institutes zero garbage areas.

Citizens Responsibility

In the residential colonies and markets the citizens with CBOs and NGOs/NGIs associated with waste management should undertake the following steps.

1. Conduct awareness campaigns to help people understand their garbage and distinguish between biodegradables (kitchen, garden and paper waste) and non-biodegradables (metal, glass, rubber, plastic). Help people understand that biodegradables should be composted and non-biodegradables should be recycled and also the 5 R's to be considered before using and/or discarding any item.
2. Starting **Waste Management Brigades**, which are decentralised, resident friendly, labour intensive, employment generating, down to earth and do not require heavy equipment or land fill sites for managing garbage. Instead need community participation and active involvement of the resident market welfare associations for every 50 flats/30 individual homes/ 25 units in the market, a 3-member Waste Management Brigade (one waste collector, one waste segregator and one waste composter) is recommended who will follow the following work plan:
 - (a) Waste collectors of each colony/ market would collect waste from every house/ unit of the market in the morning hours from 7 AM to 10 AM.
 - (b) Waste would be segregated into biodegradables and non-biodegradables.
 - (c) Biodegradables would be composted on a patch of wasteland within the colony/market. Approximately 1 to 2 sq. feet area (depending upon the biodegradables generated) would be needed for each unit.
 - (d) Recyclables would be disposed of either by selling them to the middle or upper level kabadis or deposited in the nearest plastic/paper/clothes banks set up in the area.
 - (e) Inert waste like malba could either be deposited at pre-selected malba points announced by the government or used within the colony or market.

3. Year round competitions for the cleanest street corner/back lane/ green area/ garbage bin etc. should be organised and awards given.

Conclusion

A look at the waste management practices followed by different countries shows that they have a long-term approach with specific time bound targets. The emphasis is on recycling and reduction in quantum of waste produced. Every section of society is involved and has prefixed responsibilities.

In our country too unless a National Waste Strategy is formulated with statutory targets of reject, reduce, reuse, replace and recycle it would be almost impossible to have zero garbage cities.

For householders to become green shoppers and reject non-green products massive awareness campaigns through television and radio should be undertaken. Also programmes should be broadcast on ways to reduce and reuse waste. Incentives should be announced for manufacturers to replace non-eco-friendly products with eco-friendly ones. Recycling should not be undertaken by polluting units or better still the big industrialists should take organised recyclers under their umbrella.

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Conclusion

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CHAPTER 4

Managing Natural Resources for Sustainable Mountain Development

P.S. RAMAKRISHNAN¹, K.G. SAXENA¹,
K.S. RAO² AND R.K. MAIKHURI³

INTRODUCTION

Mountain regions are of global importance. About one-tenth of the global population lives in them. Depletion of forest cover, biodiversity and terrestrial carbon stock, declining farm productivity, increasing hydrological imbalance and soil erosion are interconnected problems and the root-cause of poor economy of indigenous people and threats to global environmental benefits from the mountain systems. The interlinkages between different problems are such that we are most often faced to 'multi-cause—multi-effect scenarios' rather than 'single-cause - single-effect scenarios'. Until 1970s, environmental conservation and rural development were, by and large, treated as independent sectors. Poor outcomes of sectoral approaches, catalysed efforts on

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integrated approaches targeting resolution of environmental and socio-economic problems simultaneously. Integrated natural resource management is essentially an approach to resolve multiple and diverse problems simultaneously.

Practically, it is impossible to address 'all problems' (the sum or integrated outcome of which may be referred to as the 'problem-complex') at a time. A useful approach would be to identify the core problem(s), look at the linkage of core problem(s) with other problems and then identify key intervention(s) that reduce as many problems as possible. A simplistic view of integrated management would be to identify one or a few 'key' interventions [analogous to the concept of keystone species (Paine, 1969; Walker, 1991)] enabling environmental and socio-economic benefits simultaneously. There are two divergent approaches to analyse and resolve the 'problem-complex': (a) building on the ways in which nature, resources and livelihood have been viewed by the indigenous/traditional communities, which has been referred to as 'internal perspective' or indigenous knowledge or bottom-up approach, (b) conventional scientific approach or global economic and environmental world-view referred to as 'external perspective' approach (Hurni, 2000) or top-down approach. While advantages and disadvantages of these approaches have received much attention, efforts viewing the two approaches to be complementary are limited.

There is an increasing concern for a mountain-specific redefined developmental pathway. The developed countries have lost most of their natural resources and indigenous cultures and are realising the negative outcomes of such losses with gains in industry and economic development sector. This realisation has led to drastic changes in policies, e.g., a shift in focus from commercial farming to traditional farming. Fortunately, mountain regions in the developing world still are dominated by traditional management that tends to strike a balance in utilisation and regeneration of natural resources. There is a need for appreciation of this traditional perception in developing policies and programmes for economic development in mountain regions in the developing world such as Jammu and Kashmir. Indeed, an approach of isolating environmental conservation from development of local communities is not going to be a success. What is needed is to develop approaches of environmental conservation that leads to socio-economic development of local communities.

What is Unique to Mountain regions?

Highly diverse human societies living in the natural resource rich mountain regions of the developing world, with societal changes often occurring over very short distances of a few kilometres, more frequently accompanied by linguistic distinctions, social, economic, cultural factors, superimposed upon ecological diversity, lead to finer patterns with respect to the processes contributing to land use and land cover change. Internal pressures on the land get exaggerated through external pressures determined by policy dimensions. This implies that we need to adopt an intense community participatory approach to resource management, with concerns for sustainable livelihood/development needs of local communities located in these mountains.

Integrated natural resource management could be viewed as a multi-dimensional feature space built around four dimensions: (a) *The disciplinary dimension* is a reflection of the fact that subject specialists differ in respect of importance accorded to different natural resource capitals and processes and/or approaches adopted to analyse patterns and processes determining natural resource dynamics. For a long time, natural resources lacking any market value (e.g., soil depth, soil organisms associated with nutrient cycling) were not considered to be as important as those having market value in the conventional economics discipline. On the other hand, each and every component of the biophysical environment irrespective of market value has been viewed as equally important resource in the conventional ecology discipline. Ecologists valued ecosystem integrity that is rooted in the interaction and integration of different ecosystem components. Conventional biophysical scientists rely on measurements and experiments carried out by themselves to understand the natural resource dynamics, unlike social scientists using secondary data or inferences drawn from responses to structured or unstructured schedule. Conventional scientists did not give as much attention to indigenous knowledge as did anthropologists. Each disciplinary approach has its own advantages and disadvantages; (b) For promoting the cause of sustainable development, one has to translate the research findings into ground actions culminating in human welfare. *Human welfare dimension* seeks to take solutions to problems drawn from research to adoption by the wider community through intermediate stages such as demonstration, training and policy support; (c)

Views and stands on human welfare vary depending upon the spatial and temporal scale of measuring human welfare and relating human welfare with natural resource potential and processes. *Temporal dimension* brings out how the patterns of natural use at present will affect the resource availability, uses and human welfare in the future; (d) *Spatial dimension* addresses the question of how natural resource potential and processes in smaller segments (e.g., agricultural plots, forest patches) affect those in larger segments (e.g., watershed, catchment, biome and biosphere). Figure I illustrates how decisions on agrobiodiversity management differ with scale in typical traditional communities. Farm/plot scale management practices such as choice of crops, manuring regime, irrigation intensity, relative emphasis on pure and mixed cropping and size and composition of livestock holding are decided at the scale of household. On the other hand, landscape scale decisions such as harvesting and distribution of water for irrigation, fallowing, transhumance, extent of agricultural land use and the whole village community decides management of community forests. Farm/plot scale decisions taken at household scale are concerned more with immediate needs and responses (concern for the present), and the landscape scale decisions taken at community scale more with the future needs and responses.

Local communities in the Himalaya, as also in other mountain regions of the developing world, identify a number of problems in way of their development. These problems could be classified in multiple ways: environmental, social and economic problem or short-term and long-term problem or problem of local, regional and global significance. The degree of importance attached to a problem varies within local communities as well as between local, national/regional and global communities. For example, conservation of biodiversity and ecosystem services in the Himalaya is a global concern but stands of local communities on this issue differ from that of the national and global community. The local communities who are still not completely integrated with the mainstream development economy are not likely to appreciate an action like establishment of National Park for biodiversity conservation unless such an action takes care of their needs and aspirations.

Divergence and pluralism is evident not only between different disciplines or between different societies or cultures, but individuals

are also bogged down with divergent concerns. There are four possible perceptions related to natural environment: human well being relationships: (a) *Nature-benign perception*, which means catastrophic collapse of natural ecosystems is impossible, emanates when human thinking process is dominated by individualistic motive of maximisation of profit. Stress on cultivation of cash crops using modern inputs is a reflection of nature-benign perception; (b) *Nature-ephemeral perception* means poor resilience capacity of natural ecosystems. This perception arises when local communities have a fear of utilisation of the resources they have conserved for the benefits elsewhere at the expense of benefits to them or when they develop a belief that environmental conservation is necessary for sustainable livelihood. Strict protection of sacred groves (restrictions on all consumptive resource uses) or strong opposition to large scale felling of green trees on steep slopes (the famous Chipko movement in Garhwal Himalaya) or to huge multi-purpose river valley projects (people's movement against Tehri dam in Garhwal) which are likely to benefit national communities more than the local ones are reflections of nature-ephemeral perception; (c) *Nature-perverse/tolerant perception*, which means no significant losses if natural processes are altered within limits, derives from people's experiences on ecosystem resilience. Traditional agriculture and forest management where natural processes are altered to a minimal possible extent are reflections of nature-perverse/tolerant perception; (d) The fourth perception, *nature-capricious* means why to waste time on thinking about nature. It is an uncommon and abnormal perception. Differentiation of ecosystems in a landscape is determined by the integrated outcome of divergent perceptions manifested in individual and community behaviour.

Traditional forest management and impacts of policy interventions

Crop husbandry, animal husbandry, wild biodiversity and rural economy are closely integrated sub-systems managed at village landscape scale in the traditional system. All across the region, traditional management systems are characterised by socio-cultural-institutional mechanisms favouring a balance in utilisation and regeneration of natural resource base, equity and social integrity to achieve the ultimate goal of sustainable livelihood within small scale subsistence economy in highly isolated and

inaccessible mountain settlements. Conventional approaches to conservation have assumed traditional practices to be detrimental to conservation of wild biodiversity and ecosystem function.

Utilisation of forest resources for national economic/industrial development and environmental conservation were introduced as policy goals distinct from the one related to people-forest relationships. The majority of village common lands were taken over by the government and notified as forest and wasteland in late nineteenth century with implementation of first forest policy. As at present, government forest land is stratified into: (a) national parks where all consumptive resource uses are strictly prohibited; (b) wildlife sanctuaries where wildlife hunting is an offence but local communities may be allowed some plant resource uses free of any cost; (c) reserve forests where concessions to local communities are more liberal in comparison with those provided in the sanctuaries; resources can be exploited to meet the national economic/industrial raw material demands by the government agencies; (d) community forests whose management is entrusted to local institutions such as Forest Council (locally called as Van Panchyat in the Uttaranchal Himalaya) or traditional Village headman (locally called as Gaon Budha/Siem in some parts of the north-eastern Himalaya); village institutions are authorised to decide only on subsistence needs, need approval of government to undertake any extraction on commercial scale and have to share benefits from any commercial extraction with the government. There were two important generic implications of changes in forest land tenure/ownership and resource uses practices forced through policy and law: reduction in area freely accessible to local people and emergence of a perception among local people that policy promoted conservation or national economic development from a resource base that they had conserved and sustainably managed through indigenous practices and capacities. This is illustrated taking a few examples from the Nanda Devi Biosphere in Uttaranchal Himalaya.

Medicinal plants

Traditionally medicinal plant collection was a subsidiary activity while people went away from dwellings to graze livestock. This resource was used for local health care as well as some income. The government granted permits to individuals/contractors

during 1980s and started earning some revenue through this practice. Contractors, by and large, employed outside labour rather than local people, as the latter were likely to stress more on extraction-regeneration balance than on maximization of profits. Local people strongly opposed this policy partly because they did not get any direct benefits and partly because of the threat to their livelihood due to unsustainable harvesting by the outside labour. With strong opposition from people, this practice was terminated.

Rural development as a component of protected area management

In the traditional system, protection from exploitation by outsiders or the insiders was a collective responsibility; each household had to contribute some mandays towards protection. Policy interventions viewed protection as enforcement rather than a social responsibility. Protection accounts for a substantial proportion of government expenditure on conservation but people took it as an unproductive investment because it does not directly benefit them.

Provisions of direct economic benefits to local people are being increasingly incorporated in protected area management plans. Afforestation, mechanical soil conservation measures and supply of solar power devices, wool, improved beehives and spinning devices on subsidized price to selected households, have been included in the biosphere reserve management plan. Yet, local people largely perceive the benefits far less than the losses due to enforcement. This perception seem to stem from divergence in development options preferred by the local people and those incorporated in management plan which in turn is rooted in a negligible involvement of people in reserve management planning and monitoring. People's preferred ways of resource uses may not necessarily fall in line with the goal of conservation and hence might need moderation.

People-wildlife conflicts

Penalties for killing wildlife imposed by protected area managers is another key change that follows enforcement of protected areas. Local people dislike this policy as it treats outsiders hunting wildlife for game or economic gains at par with local people who resort to killing only when a wild animal turns

extremely hostile. Such a policy is also looked by local people as way of promoting conservation at the cost of their livelihood. Involvement of local people for surveillance of game or commercial hunting together with interventions that keep the predators away from settlements and their resource catchments could be, a way of resolving this conflict.

Though it has been argued that increase in frequency of livestock killings in the recent past is because of increase in livestock population, possibility of increase in predator population following strict conservation measures implemented since 1972 cannot be completely ruled out. Protected area management does have a provision of cash compensation for livestock killed by wildlife, which is indeed an advantage to local people conferred by the conventional conservation approaches. However, funds available are too low to compensate the losses and procedure too complex to be understood by the community. Enhancement of traditional practices to protect livestock from wildlife depredation is likely to be a more effective way of resolving wildlife-people conflicts than providing cash compensation in developing countries.

Conserving/Rediscovering 'Cultural Mountain Landscape'

The concept of a cultural mountain landscape still remains a vibrant and viable entity in the developing country context. The mountain landscape here, has a variety of natural and human-managed ecosystems, and even 'sacred groves' (sacred ecosystems) or 'sacred landscapes' protected for cultural/religious reasons. It is in this context it becomes important to look at these ecosystem types, understand their functional attributes and learn lessons which may be relevant for managing 'cultural landscapes', as an integrated socio-ecological entity, in a sustainable manner.

There is also a wider recognition throughout the globe and across disciplines that regions of ecological prudence exhibit a symbiotic relationship between biophysical ecosystems and social systems, with strong cultural inter-connections between the two. This explicates that culture and environment are complementary, and in various stages of evolution. The concept of '*cultural landscapes*' ('*sacred landscapes*') is an outcome of this recognition by the traditional societies, wherein they modify nature, actively maintaining it in a diverse and productive state, based on locally

evolved TEK. The concepts of 'sacred species', 'sacred grove' (sacred ecosystem) and 'sacred landscape' represent various stages in social selection. The concept of sacred mountains is worldwide. The guiding principles that regulate the use of natural resources are embedded in the codified and often non-codified institutions that they have evolved. These sacred institutions were originally intended to boost social solidarity rather than promoting environmental consciousness *per se*, but the conservation values, *ipso facto*, also got fulfilled.

We have to learn many lessons from the way sacred landscapes are sustained through traditional institutions in the developing tropics. Sacred groves as representative samples of protected natural ecosystems could form the basis for rehabilitation of degraded ecosystems all around. What is a culturally valued tree species, often also happen to be an ecologically significant keystone species in the ecosystem, with the ability to support much associated biodiversity. All these socio-ecological linkages that traditional mountain societies still have in the developing world and that the developed world has already lost, and remains to be rediscovered, could form important elements for sustainable forestry management and rehabilitation of degraded landscapes.

Pathways for Agro-ecosystem Development

The pathway for agricultural development needs to be based on a value system that the society has, in the socio-ecological context in which they operate. There are three options (Swift *et. al.*, 1996) that are possible:

Incremental pathway: This pathway suggests that the traditional ecological knowledge (TEK) available, with the local communities should form the basis for ensuring community participation. Thus, for example, Sweden agriculture still prevalent in the tropical mountains of Asia, Africa and South America and which has become untenable for a variety of reasons, has defied a solution in spite of trying to work out an alternate solution. This land use system and many other traditional agricultural systems operating that are casually managed or at low intensity management levels need to be redeveloped through incremental, rather than quantum change, based on TEK; anything drastic may not find acceptance by the local communities. Thus, one may have to consider a short-

term compromise that may be constrained because of ecological, economic, social and/or cultural reasons, apart from a more ideal and perhaps desirable long-term strategy.

The 'contour pathway': This pathway seeks to acknowledge and work with the ecological forces that provide the base on which the system must be built, while acknowledging the social, economic and cultural requirements of the farming communities. Working with Nature, rather than dominating it, this approach would involve active planning with the nature of the background ecosystem fully in mind. Many agro-ecosystems types in the 'low' and 'middle' intensity management categories will come under scrutiny under this pathway. A whole variety of agro-forestry and alley cropping systems, for example, come under the 'contour pathway'. A variety of attempts are now being emphasized to develop agro-forestry models, based on TEK, of local communities, and thus take on board the social dimensions of the problem.

Modern agriculture: Modern agriculture which demands very heavy energy subsidies in the form of inorganic fertilizers and pesticides, and standing apart as an artificial monoculture entity from the rest of the landscape, is a pathway which has limited value in the developing country context; it could at best be confined to valley lands only.

Mountain agriculture in the developed world is largely high-energy input terraced agriculture, which has already been responsible for a variety of soil pollution problems, which has led to a concern for alternative models for sustainable agriculture. There is an increasing interest now, more than ever before, in creating buffering mechanisms that may help in overcoming the ill-effects arising from modern agriculture. One of the possibilities that has evoked much interest is to look at options of managing organic residues such that higher and sustainable crop yields are obtained with lesser dependence on forests for fodder, manure and fuelwood as well as synthetic chemical inputs that may not be environment friendly in mountain environments.

What is Sustainable Mountain Landscape Management?

There are many lessons that one could learn from traditional societies for sustainable landscape management. Understanding

adaptive social evolution of land use practices of these societies could be an important basis for designing strategies for landscape management in the mountains of the developing world, with a view to cope up environmental uncertainties arising from 'global change'. Realizing that biodiversity and ecosystem complexity do contribute in a variety of ways to ecosystem functions and that agroecosystems do harbour a great deal of crop biodiversity valuable for general human welfare, it is reasonable that we go in for a mosaic of natural ecosystems coexisting with a wide variety of agroecosystem models derived through all the three pathways. Such an approach is important even for sustaining the more widespread 'modern agriculture' in the mountains of the developed world. The relative apportionment of land for environmental protection and farming, and within farming, the relative emphasis on the three pathways for agricultural development stated above should be determined by socio-ecological factors. Under better soil fertility conditions, such as in mountain situations with extensive valley lands and gentle slopes, where high energy input could be sustained, the emphasis could be more on 'modern agriculture', but combined with agro-forestry/forestry to buffer the ill-effects arising from intensive farming practices. On the other hand, where traditional mountain societies are involved as in the developing country context, the emphasis may have to be more or less on either the 'contour' or 'incremental' pathways, even if it be as part of a short-term strategy for sustainable management of mountain resources. For obvious reasons, the overall emphasis in the mountains, has to remain on sustainable forestry practices. The bottom line should be managing the mountains for a highly diversified landscape, as a means to cope up with the obvious mountain ecosystem fragility.

Conclusions

Mountain regions in the developed temperate world remain to a large extent heterogeneous only in a biophysical sense, but largely homogenized in a socio-economic and cultural sense, arising from industrialization and urbanization. In the developing tropics however, the socio-cultural and biophysical environment still remains highly heterogeneous. The struggle in the developing world is to conserve the 'cultural landscape' under threat from increasing onslaught from modern civilization, sustain the socio-

cultural heterogeneity and at the same time aiming to provide a better quality of life for the mountain people (Ramakrishnan, 1998). In the developed world, however, the local communities are in the process of rediscovering the 'cultural landscape' and retrieving their lost linkages with Nature and natural resources. The overall objective remains the same, but the beginnings for a common goal are being attempted from two opposite points, for obvious historical reasons. This a dilemma which we face today.

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CHAPTER 5

Soil and Water Conservation in situ an Innovative Technique

S.D. SWANTANTRA*

There are several water harvesting measures but in Jammu and Kashmir Himalayan and Shivalik regions, water harvesting structures for individual plants have proved very effective for greening the waste lands.

Case study of plantations raised by J&K Social Forestry Project has been presented in this article to highlight the importance of innovative water harvesting technique and adoption of this technique on large scale has been advocated for quick effective results.

SITUATION AND AREA

The State of Jammu and Kashmir is located in the northern most-corner of India and lies between 23°17' to 37° north latitude and 74°-18' to 80°-83' east longitude. Total area on this side of line of actual control is 138942 sq kms.

The terrain is hilly and mountainous excepting a small fringe of plain land in Jammu and Kashmir valley. The State has three distinct physiographic zone (a) Jammu (b) Kashmir and (c) Ladakh.

ISSUES AND PROBLEM ANALYSIS

On the one hand, there is a problem of depletion of productivity of soil due to various factors, like soil erosion, water

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logging, development of alkalinity and salinity and on the other hand, we are confronted with serious problems of shortages of fodder, fuel wood and small timber for increasing population of human beings and cattle. Need to protect soil is imperative for survival of human race which in turn is linked with Bio-mass productions.

Land has to be used as per potentially which varies from site to site. There cannot be uniform model. But basic necessity to use rain and snow water efficiently holds good everywhere. Conservation of water automatically conserves soil and productivity of land can increase many fold. Land has to be managed on the basis of watersheds.

There are large variations in soil, climate and edaphic conditions in the same watershed. Therefore, cultivation practices, crop varieties, plant species and technology have to be different for different topo sequences even within same watershed.

We are proud of our composite culture "unity in diversity". Problems differ from village to village and from house to house. Before we plan our strategy for future course of action. We must know resources and potentialities. Second step must be to fixation of priorities i.e. needs and site based technology to be adopted and thirdly plan must be acceptable to people.

Floods are playing havoc with irrigation systems. River beds are rising. Canals are being silted up thereby compelling Governing to spend huge amount on desiltation. Need of the hour is to conserve soil and water in situ.

Each point in earth falls in watershed of some river. Why not to conserve water where it falls. In case water flows away, it just be clear i.e. free from silt. Role of water in growth of plants must be fully understood before we go ahead. Water acts as medium for supply of plant nutrients present in soil which are dissolved in water. Soil, are and soil micro-organisms must remain in healthy conditions. Soil organisms like worms, insects and tiniest bacteria occur only in normal soil where sufficient air is present in soil pores. Stagnation of water around the plant in pit, thus adversely affects the growth of plants in two ways.

When stem remains dipped in water, amount of soil air depletes down. After water is evaporated or percolated into soil,

hard pan formation develops around the stem. In both cases, lot of harm is done. Either growth remains stunted or plant dies.

Techniques of raising plants in pits is thus not proper. In nature, there is no depression around base of plants. It is, therefore, of paramount importance that not only we should stop raising of plants in sunken pits or trenches' but also strive for using water efficiently by making micro-watersheds for individual plants. I, therefore, developed innovative technique to harvest rain/snow water.

Labourers and field workers can easily understand this technique. I developed this technique in 1998 while working DFO Udhampur.

S.F. Project, was the first Government agency which adopted this technique in 1990-91.

In case of gravely and sandy soils, continuous trenches in combination with micro-watersheds for individual plants have proved highly successful.

Integrated Approach

All five element constituting environment i.e. water, soil and flora and fauna are inter dependent inter connected and inter-related. Human being are part of ecosystem. All the five components of environment have co-evolved and co-adopted. Deterioration in one inevitably effects the other four. Approach to tackle the problems has therefore to be integrated and holistic.

We are striving for sustainable development. In case our development activities gives rise to soil erosion this cannot be termed as sustainable development. UNDP defines sustainable as, "Equitable and environmentally regenerative economic growth which empowers people rather than marginalises them. It is pro-nature pro-poor, pro-jobs and pro-women".

It is thus very much clear that when we work for sustainable socio-economic development of people, it has to be ensured that Natural Ecosystems remain in fact. Natural Ecosystems cannot be protected by keeping people isolated. For sustainable development, these should be sustainable relationship of people with environment i.e. forest, minerals, land, water, medicinal plants.

Government functionaries who manage sustainable development must be thus knowledgeable about natural resources. Ecosystems, Biodiversity, natural regeneration techniques, tissue culture, grafting etc. All have to be integrated. Both part to part and part to whole integration is critical.

Involvement of people

Role of innovations has been acknowledged to fill the Economic equilibrium of society towards betterment. We should not only attempt to introduce the latest concepts and knowledge in the field of enhancing productivity, but also incorporate growing elements and aspirations of people to get better facilities, no body can study environment is thus shallow. The perception can be upgraded by repeated visits to any site and long study is required to have perfect perception. Only local people understand the environment thoroughly since they have accumulated experience and knowledge. This is why National Forest Policy and Rio-Earth Summit laid stress on involvement of people. But people are intelligent. They do not believe what we say but they only understand actions. Once they are convinced about actions of government functionaries, they come close and participate.

Since soil and water are two basic ingredients, I would like to deal with these elements. Conservation of soil and water is part of our age-old philosophy. While recognising important of participation of all people, Vedas say:

ओ नी भद्रा

क्रततो यन्तु विश्वतः

Let knowledge and noble thoughts came to us from all sides.

While laying emphasis on soil and water conservation, our ancient Scriptures speak clearly and loudly.

या रक्षन्तयस्वप्रा विश्वदानी

देवा भूमि पृथ्वी म प्रसादम

सानो मधुप्रिया

दुहामघो उ क्षतु वर्चसा

Those who are ever wakeful in keeping constant vigil for protection of their land are the only brilliant scientists on the face

of the planet. Holy epics while laying stress on well protected soils proclaim.

शानो भूमि वर्धयद
वर्धमान

Growing soil leads to growth and development of a nation

Loss of soil from its sources is thus greatest irreparable loss to country, here lies the role of technology. Upgradation of technology is also continuous proves which depends upon feed back. Technology when integrated with human resource can bring spectacular results with minimum human effort and with minimum expenditure. Perception of government functionaries must tally with perception of people. Without common perception, there cannot be common reaction and without common reaction there cannot be common action.

I tried to integrate technology with human resource with working Regional Director, Social Forestry Project, Jammu region from May 15, 1990 to January 15, 1993, I applied soil and water conservation technique for individual plants along-with techniques like grafting, preferential treatment to spp. etc. and results were shown to people at Kaloa, Jammu district in 1990-91. People were convinced about superior technology and outstanding performance. They, therefore, started offering more and more village common lands.

THE TECHNIQUE

Though there are several water harvesting measures, such as levelling of land, making of continuous contour trenches and other engineering measures, but on sloppy, barren lands a semi-circular ridge with the plant on the middle of the ridge and a depression on the uphill side has proved most economical and effective.

The technique basically involves providing depression on the uphill side and the soil thus excavated is used to construct a semi circular ridge on the down hill side to act as a barrier to trap water. The stem of the plant, which is transplanted in a pit prior to making of depression, is embedded at the centre of the semi-circular ridge. The method of digging out soil in the pit should

also be explained to the people engaged in plantation work. Normally soil is dug out and haphazardly thrown on the down hill side, where it is subject to weathering. The entire dug out soil is not put back in the pit. A better approach would be to keep the organic matter rich top soil, and sub-soil separately. While refilling the pit, the top soil should first be placed at the bottom of the pit, and the soil at the bottom after removing all pebbles and boulders if any should be placed at top of the pit. Plants from the nursery should be transplanted in such a manner that only the portion up to collar level remains underground, and the pit does not remain sunken. After planting is over, the water harvesting structures should be made.

In case of sandy, sandy-loam and gravelly soils, where water does not stagnate but percolates downward quickly, plants raised on berms of channels or embedded in semi-circular ridges may not get adequate supply of moisture. In such areas continuous contour trenches will be ideal. Vertical interval from channel to channel may vary from 5 m to 10 m, depending upon slope of the land. Depth of the "V" shaped channel should be 30 m and edge to edge distance will be 45 m. Plants will be raised in channels in pits. Grasses and shrubs to be raised on berms of channels. We may raise grasses, or horticultural trees in combination with grasses or silvi-pasture or only agriculture crops, contour channels will hold rain water and collective action of so many channels will help in improving soil moisture regime and enhance over all productivity of the land. In due course of time, contour hedges will be created which will help in combating both, wind and water erosion.

Results and Discussion

1. Root zone of plant gets optimum quantity of moisture for a longer period. Since the tiny micro-watershed helps in percolation of water during rainy season into the deeper layers of soil.
2. Soil erosion is checked.
3. Collective action of large number of small reservoirs helps in improving ground moisture regime and recharging of aquifers.
4. Natural fodder grass quickly occupies intervening spaces, and its production increases with availability of moisture.

5. In degraded forest areas, naturally occurring species which exist in coppice form, attain rapid growth due to improvement in soil condition and more natural plant species and legumes appear in the area.
6. People can switch to stall feeding when adequate quantity of grass leaf fodder are available.
7. Better moisture condition helps in better growth of bushes like *Adhoda vasica* (Bhankar), *Berberis* and *Dodonea*.
8. An entire chain reaction starts as availability of more fodder and fuel wood means less time required for collection of these products. This in turn will enable people to devote more time to household and cottage industries.
9. Fruit trees can also give more returns in case harvesting structures are made.
10. Plants are firmly held and can thus withstand wind action to greater extent, in comparison to plants raised in sunken pits.
11. By adopting water harvesting technique, we can reduce expenditure on construction of irrigation canals, which are more damaging than beneficial, especially in the hills. In case we spend even half the money on water harvesting measures, as on irrigated areas, rainfed lands can produce much more food.

Phenomenal Growth in Area Coverage

There was 77% increase in area brought under village woodlots during 1990-91, over 1989-90 achievements. During 1991-92, there was unprecedented increase in area under village woodlots in Jammu region. There was 397% increase over 1990-91 level. Society for Promotion of Waste Lands Development, New Delhi conducted study of period between 1989-90 and October, 1992 and described soil and moisture conservation technique as most effective. Central Soil and Water Conservation Research and Training Institute, Research Centre, Chandigarh while commending the technique has desired its replication on large scale. Mr. P.P. Patnaik, IFS the then Chief Conservator of Forest, Social Forestry Project writing in Social Forestry Project News Letter Oct. Dec. 1995 highlighted the contribution of this technique and reported upto 90% success of plants raised with the technique and gave credit to this technique for extension of social forestry Project in J&K State.

Participation of People and Sharing of Benefits

Participation of people rose abruptly between 1989-90 and 1992-93. There were only 23 village committees; in Jammu region up to 1989-90. This number increased to 84 in 1990-91 to 185 in 1991-92 and 400 in 1992-93. Social Forestry Project supplied only 10180 qntrs of fodder to people in 1989-90. This figure increased to 23582 qntrs. of fodder to people in 1991-92 and 116000 qntrs in 1992-93. Number of beneficiaries increased from 4954 in 1989-90 to 7547 in 1990-91, to 16154 in 1991-92 and to 23588 in 1992-93. Social Forestry Project covered only 5230 hect. under village woodlots during first eight years 1982-83 to March 1990. In Jammu region only 4917 hect. area was covered under this category only in two years i.e. 1991-92 and 1992-93. Moreover following adequate vegetative cover, need of raising new plants declined and Social Forestry Project could save huge amount. Only in Jammu region there was saving of more than Rs. 2.50 crores in 1992-93 under rehabilitation of degraded forests and villages woodlots components. Upto March 1990 more than 2500 plants at the rate of 350 per hect. were raised. This was as a result of site specific approach.

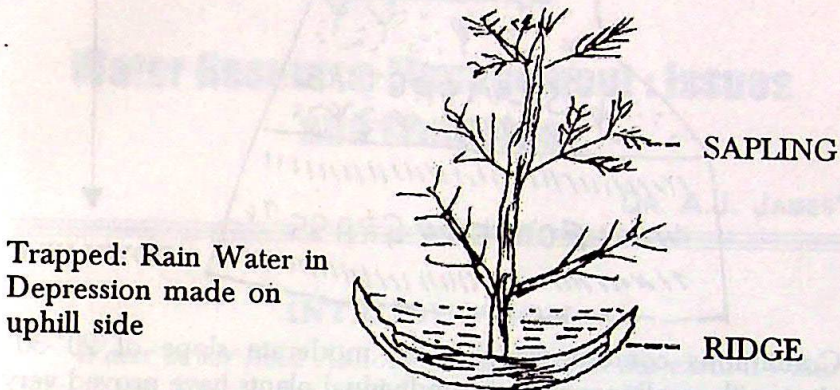
CONCLUSION

The water harvesting technique can help in exploiting the full potential of the land conserving both, soil and moisture. A key factor in future agricultural and forest development in India is going to be efficient use of available water resources for crop production. The water harvesting technique, if sincerely adopted, will definitely play a pivotal role in helping increase overall productivity of forest and agricultural lands.

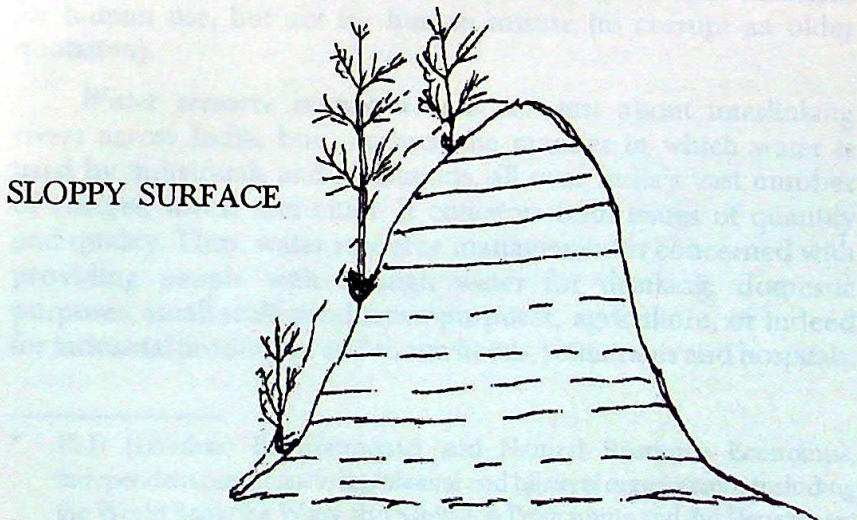
The Forest Department must make concerted efforts to generate technologies and extension material in local languages for the benefit of people. We have to help in creating a massive people's movement for conservation afforestation, forest protection and efficient use of forest products. The mass communication media and the extension network of forest and other government agencies must join hands in dissemination of innovative techniques, especially water harvesting technique for individual plants. This holds the key for rapid socio-economic development of rural areas and will effectively half degradation of environment.

SUMMARY

In this paper an innovative technique of water harvesting to increase overall productivity of forest and agricultural lands has been described.

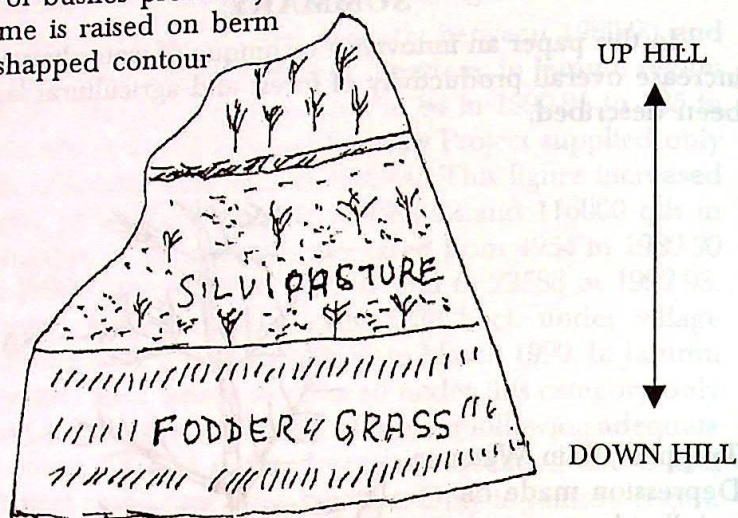


Water Harvesting Technique to assist soil and water conservation in situ.



Trapping surface water in small reservoirs; meant for individual plants helps in maintaining optimum moisture and air regime in root zone which in turn facilitates un-interrupted availability of soil nutrients to plants for quick growth.

Hedge of bushes preferably of legume is raised on berm of 'V' shaped contour trench.



Continuous contour trenches on moderate slope of 20° - 30° along with small reservoirs for individual plants have proved very effective in conservation of soil and moisture in situ.

CHAPTER 6

Water Resource Management : Issues and Concerns

DR. A.J. JAMES*

INTRODUCTION

Water in our lives: Although nearly 70% of our earth is water, only about 30% of this water is fresh water. But most of this freshwater is in the form of unusable polar ice, and only about 4% is useable. Still, there is plentiful water for human use - sufficient for human use, but not for human misuse (to corrupt an older quotation).

Water resource management is not just about interlinking rivers across India, but concerns the manner in which water is used by individuals and institutions, all over India's vast number of villages, towns and cities. It concerns both issues of quantity and quality. Thus, water resource management is concerned with providing people with enough water for drinking, domestic purposes, small-scale productive purposes, agriculture, or indeed for industrial production and to run hotels, restaurants and hospitals.

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Such management also has water quality in its ambit, and is thus responsible for providing water that is not contaminated by chemicals, biological waste or sediments.

Water boundaries? Water knows few boundaries, and so water management ought to cut across traditional geographical divisions of 'urban', 'rural' or 'peri-urban' use, or indeed of 'agricultural', 'domestic', 'industrial' and 'institutional' uses, or of 'surface' water and 'ground' water. But either for administrative convenience or indeed disciplinary focus, water issues are often studied in isolation. While this is often necessary for clarity of thought, such divisions ought not to hamper good management of what is fast becoming a fast resource.

Three issues are addressed in this paper, for their relevance to the situation in Kashmir: river water management, pollution of lakes and water bodies and protecting drinking water sources.

Major concerns in each of these areas are outlined, based on the Indian experience, and some general suggestions are made in the concluding section on how these are best addressed.

RIVER WATER MANAGEMENT

Snow-fed rivers tend to be perennial and so do not suffer as much from wide variations in base-flow rates as do other rivers in the Indian sub-continent. Two types of human interventions, however, can affect the flow in these rivers:

- **Reduction of natural recharge:** Human settlement activity can block natural drainage pathways to rivers, thus reducing the quantum of water flowing in them over time.
- **Diversion for irrigation use:** While irrigation is a human need, the construction of diversion works downstream of Haridwar reduces base flows in the Ganga river so much that it can no longer dilute the pollutants thrown into it between Kannaui and Allahabad.

In addition to these quantity dimensions, human activity often reduces water quality, and thus reduces the utility of these precious resources for human consumption. Two major sources are:

- **Industrial pollution:** Tanneries, breweries, and chemical factories are among 17 highly polluting categories of industries

identified by the Central Pollution Control Board of India, while several millions of household-based electroplating and chemical units dump hazardous chemicals like mercury, zinc, cadmium and lead into urban sewage systems all over India. These deadly chemicals kill the friendly microbes in sewage treatment plants, and then pollute the water bodies into which the untreated sewage also flows.

- **Domestic sewage:** More than industrial effluents, however, domestic sewage was found to be the major culprit into water pollution into both the Ganga and Yamuna rivers. Sewage treatment plants are notoriously inefficient, and within about 5 years of their use an average-maintenance plant loses almost all its effectiveness, pumping raw sewage into streams and rivers, but giving an illusion of pollution control.

The point is simply that while human needs like settlements, irrigation, industrial production and sewage disposal cannot be denied, care must be taken not to over-strain the regenerative powers of rivers and streams and thus to use them to extinction.

Yet, countless studies and pilot projects from all over the world have shown that it is possible to use river waters sustainably. The Murray-Darling basin is the best example of integrated water resource management the world over, but we have a rich wealth of tradition in using river waters sensibly.

POLLUTION OF LAKES AND WATER BODIES

While the Dal lake is a world-renown symbol of Kashmir, and the pride and joy of Srinagar, it is also true that the lake is one of the most heavily polluted lakes in the country. As in the case of rivers and several famous lakes all over India such as Nainital, Bhimtal and the Bhopal lake, domestic sewage is a major culprit.

However, care has to be taken while addressing this problem, and in particular the conventional engineering approach of treating lakes as a giant freshwater bowl and trying to stop all other uses of these lakes can be 'socially destabilising'. It must be remembered that lakes have a range of ecological and human uses. The Bhopal lake, for instance, supports the fragile Bhoj Wetland system of marshes and bird life, apart from a rich diversity of flora and fauna. Apart from the city government which uses it for its

drinking water supply, fishermen, water chestnut (*singhada*) farmers and dhobis, are also legitimate users of this resource, apart from tourists and city residents, who love to picnic by its shores.

While a government is certainly empowered to act 'on the interests of the citizens' and protect certain natural resources for public use, dispossessing sections of mostly underprivileged society from their livelihoods goes against all norms of social justice. One need only to imagine the effects of removing the houseboat dwellers from Dal lake to recognise the sheer human and political folly of this means of protecting a natural resource as a source of drinking water.

Thus, natural resource protection is necessary, but careful consideration of the human, social and political context of such action needs to inform such action.

PROTECTING DRINKING WATER SUPPLIES

All of us need water to drink and cook, and we in Delhi are particularly aware of the problems caused by the inadequate quantity and quality of public water supply. Most cities in India are expanding, and so are their demands for adequate water. Bangalore has nearly doubled its intake from the Cauvery, while Chennai is getting water from faraway Krishna and Hyderabad is considering bringing water from the Godavary. What a lot of these efforts wilfully ignore, given the political pressure to provide urban vote-banks with water, is that these same river systems have to supply drinking water to smaller towns and villages all the way to the sea apart from irrigation to fields.

Apart from rivers, water supply is also being sourced from groundwater aquifers through bore wells. There is mounting evidence from all over the country, that our ground water resources are being 'mined' - i.e., more is being abstracted annually from these aquifers than is being replenished through annual rainfall. And, of course, the problem worsens when rains also fail.

Preserving the stock of available water resources, both above and below the ground, requires careful planning and husbanding. Yet, it is often the government that sanctions large-scale abstractions of water from surface and ground water sources. Given the multiplicity of Ministries and Departments, at both Central and

State government levels, the left hand often does not know - and does not care - what the right hand is doing.

However, the basic blame lies with citizens like you and I, who need to limit our demand for water. In one village in rural Maharashtra, drinking water was rushed in tankers to a water-parched village - amidst standing sugarcane crops. Even in a city like Delhi, it is easy to see green lawns being over-watered through the peak of summer, and cars being washed with running water from hosepipes. But when a government drags its feet over implementing proposals to put in tamper-proof water meters, to cut down on illegal water connections, and to spend money on repairing and maintaining inefficient pumps and leaking pipelines, can one only blame the public?

At least today one cannot cite an absence of the required technology. There are good and efficient technologies for recycling and reusing water, besides for rainwater harvesting. There are also technologies like the Bambamanzi system of South Africa, where one can buy 'water cards' which are inserted into metered water points (even inside one's house) and will allow users to draw as much water as they have paid for. Once the credit is exhausted, they can always replenish their cards by paying more and recharging the cards.

TOWARDS SUSTAINABLE WATER RESOURCE MANAGEMENT

The overwhelming message from international sustainable development gatherings all over the world is that there is hope for us yet. But we have to work hard to ensure that our natural resource base can sustain future development. Generally, as well as in the specific cases of rivers, lakes and drinking water, there are three key factors for sustainable development:

- **Reliable information:** A reliable sound database of technical, social and economic information on whether our resource use is sustainable is vital. Without knowing how much of the resource we are using, can use and should use, corrective action will either be too little - with disastrous consequences for the natural resource base - or too much - with perhaps equally disastrous implications for human development. Today we have the wherewithal and the technical competence to set up such information systems.

After all we lead the world today in providing manpower for information technology.

- **Adequate awareness among the people:** Having information in government offices or research institutions is not enough: it is perhaps more important that lay people like ourselves, who are affected directly or indirectly by the sustainability of our natural resources, need to know as well. And today we have several means to provide information, ranging from the print media, local language and cable television networks, radios, and the ever-growing Internet, besides traditional theatre and other media.
- **Effective systems of governance:** After 50 years of government - by politicians for politicians and of politicians - it is time to broaden the notion of government and give a more prominent role to civil society. Public-people-private partnerships are the institutional innovation that is increasingly being called for, by the World Social Forum among others. The basic idea is simple. Once you give people ownership and control over the resources that concern them, they will take care of them. For all the rest, we can have the government. Even if we do not wish to bestir ourselves and take up public-spirited work, we have a rich tradition of non-governmental organisations, social service organisations and resident welfare organisations. Lets involve more people in from planning natural resource use, carrying out these plans, monitoring their impact and taking corrective action when things go wrong. Of course, things cannot be left entirely to the people, and there is also a need for a strong framework of rules, regulations and infrastructure for effective policing and enforcement. But the government should increasingly facilitate and foster public participation, instead of trying to do it all.

While all three are certainly possible in the Indian context, they require radical change in the mindset of government officials, politicians, academicians, the private sector and the citizenry, and the hard work of initiating and sustaining such change. Thus, while natural resource management is the exception rather than the rule in most cases all across the country, there is hope that we can correct the fragile balance before it is too late, and that the people like us, who stand to gain the most by good stewardship and to lose the most by mismanagement, will come forward to put their shoulder to the wheel of change.

CHAPTER 7

Environmental initiatives for Sustainable Development

PROF. B.B. DHAR*

INTRODUCTION

The concern for environment in India began with Stockholm Conference (1972), when the Indian Government took a serious note of the happenings, and that resulted in taking necessary steps to protect the country's environment. The term Sustainable Development, in the meantime, gained importance and became a buzzword for all concerned. The term has been well defined in Brundtland Commission.

Sustainable Development is which promises to meet the economic and environmental needs of the present while enhancing the ability of future generations to meet their own needs. (Ref:- Brundtland Commissions prescription).

CONSTITUTIONAL PROVISION FOR ENVIRONMENT IN INDIA

The Government of India within five years of the Stockholm Conference (1972), took the following steps to meet the need for environmental protection.

1. The 42nd Constitutional Amendment was made (1976) to include **"Environmental Protection"** as a

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Constitutional Obligation - "**Article 48A**", it lays down
*"The State shall endeavour to protect and improve the environment
 and to safeguard the forest and wildlife of the country"*

2. **Article 51A**, relates to fundamental duty. This article runs :

*"It shall be the duty of every citizen of India to protect and
 improve the natural environment including forests, lakes, rivers
 and wildlife and to have compassion "for living creatures".*

NATIONAL COMMITTEE ON ENVIRONMENT PLANNING AND COORDINATION (NCEPC)

This Committee was also soon set up after Stockholm
 Conference (1972), and was concerned with issues relating to:

Appraisal of Development Projects
 Human Settlement Planning
 Survey of Ecosystems (e.g. wetlands, etc.)
 Spread of Environmental Education

"TIWARI COMMITTEE" ON ENVIRONMENT

This Committee was set up in 1980 by Government of India
 to make recommendations on environmental issues. It
 recommended the following:

1. A comprehensive review of the State and Central Acts, e.g.
 The Water (Prevention and Control) Act, 1974, Indian Forests
 Act, 1927, Insecticides Act, 1968.
2. New legislation on the areas not covered by the present laws
 (e.g. toxic substances etc.)
3. The introduction of "**Environmental Protection**" in
 the Concurrent List of the Seventh Schedule.
4. Later the Committee recommended Establishment of a
 separate '**Department of Environment**' (DOE).
- DOE was established on **Nov. 1, 1980** by the Government
 of India.

The following functions were assigned to DOE:

- To act as nodal agency for environmental protection and eco-
 development in the country.
- To carry environmental appraisal of development projects
 through other Ministries/Agencies as well as directly.

- To have administrative responsibility for :
 - (i) Pollution monitoring and regulations
 - (ii) Conservation of critical ecosystems designated as Biosphere Resources
 - (iii) Conservation of Marine Ecosystem

This was followed by creating National Committee on Environment Planning.

NATIONAL COMMITTEE ON ENVIRONMENT PLANNING (NCEP)

However, the NCEP was soon replaced by a National Committee on Environment Planning (NCEP), with the following functions:

- Preparation of an annual **"State of Environment Report"** for the country.
- Establishing an **Environmental Information and Communication System** to propagate environmental awareness through the mass media.
- To sponsor **Environmental Research**
- To arrange **public hearings** or **conferences** on issues of environmental concerns.

Here the word "ENVIRONMENT" is used in its widest sense. It means all external environmental conditions and factors affecting **Human, animal, and Plants**.

The external factors include **climate/water/noise/temperature, soil** etc.

And, the State was also empowered to take effective steps to prevent the damage to the environment and ecology.

ENVIRONMENT PROTECTION ENACTMENTS

At the Stockholm Conference, the then Prime Minister, **Smt. Indira Gandhi** said

" extreme forms in which questions of **population or environmental pollution** are posed, obscure the total view of **political economic** and **social** situations It is said that in country after country, progress should become synonymous with an assault on nature Among the rest

mankind, we in India — in spite of Ashoka — have been guilty of wanton disregard for the curses of our sustenance”.

To meet these challenges, India also embarked on several **legislative measures** for the **protection of environment**, and **for maintaining ecological balance**. These were:

- The Water (Prevention and Control) Pollution Act, 1974
- The Forest (Conservation) Act, 1980
- Air (Prevention and Control) Act, 1981.

These Acts were amended from time to time to make them more effective.

- Another feature was to establish **independent Ministry of Environment and Forest** by the Central Government in 1985.

ENVIRONMENT PROTECTION ACT, 1986

Till 1980's, the emphasis was chiefly to prevent and **control pollution**.

- In 1986, Government of India passed a comprehensive **Environment Protection Act (1986)** as our aftermath of **Bhopal tragedy of 1984 to cover** many aspects **other than Prevention and Control of Pollution**.
- The Act changed the whole concept and gave enough **scope** to the Government and even an individual to act and go **to Court for Pollution prevention**.

The Act was passed for :

- (i) the protection of environment,
- (ii) regulation of discharge of pollutants,
- (iii) handling of hazardous substances,
- (iv) speedy response in the event of accidents threatening environment, and
- (v) deterrent punishments to those who endanger human environment, safety and health.

SEVENTH (VII) AND EIGHTH (VIII) PLAN STRATEGIES

These plans laid down well-defined strategy for environmental protection.

VII Plan - Strategy was to achieve substantial development in harmony with (natural) environment.

VII Plan's main components in regard to environment protection were:

- Pollution monitoring and control
- Environmental impact assessment
- Resource conservation
- Eco-development
- Environmental research promotions
- Environmental education, training and awareness
- Environment Information
- Coordination and liaison with State Governments and Union Territories
- Environment Policy and Law
- Strengthening of the organisations.

VIII Plan's contribution was to further strengthen the Environmental Policies.

A **Cell** was also set up by the Government of India, to ensure effective **implementation of anti-pollution measures** for the protection of environment by:

- Launching of new programmes [e.g. cleaning of rivers (like Ganga and Yamuna)]; Project of Afforestation etc.
- India also became signatory to Earth Summit in 1992.

NATIONAL CONSERVATION STRATEGY AND POLICY STATEMENT ON ENVIRONMENT AND DEVELOPMENT

Policy Statement

Immediately after the Earth Summit (1992) India has taken several steps in the direction of **Conservation of Environment and Development** in harmony with Environment. The National Conservation Strategy and Policy Statement on Environment and Development was a step in that direction.

- New Acts, **Amendments/Regulations** were made, and existing ones modified e.g.
Wild Life/Water/Forest/Air Act/Environment Protection Act, 1986/Motor Vehicles Act/Public Liability/Insurance Act, 1991/

Coastal Zone, 1991 Amended in 1994, 1997/Env. Audit Notification/Eco Mark Notification 1994/ Public hearing Notification 1978 etc.

National Environmental Appellate Authority, 1997
Coastal Zone Management Authority, 1998

The following new Institutes/departments/organisations were created by the Government of India from time to time:

Departments created (S&T, Biotech, Ocean Development, Space, Energy, Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB)

- Ministry of Environment and Forests
- Forest Research Institute (FRI), Dehradun
- Forest Survey of India (FSI)
- Botanical Survey of India (BSI)
- Zoological Survey of India (ZSI)
- National Environmental Engineering Institute (NEERI) (CSIR)
- National Wasteland Board
- Centre for Environmental Education
- Wadia Institute of Himalayan Geology
- National Museum of Natural History

The four-key corner stones of sustainability for industry are:

- Environment
- Low cost, and energy efficient extraction techniques
- Safety and health, and
- Effective consultations with stakeholders. (*Ref.- Man and Child for Sustainable Development.*)

CONCLUSION

Environment itself being a dynamic process, the MOEF keeps on issuing new laws/regulations and guidelines from time to time to ensure sustainability of the resources and Sustainable Development of the all the Environmental Pollution Control Act, 1986 is the most significant one.

In the area of Forest Conservation, MOEF has taken several special initiatives to protect it. At the same time, the Supreme Court also intervened at times and gave several guidelines and directions to protect the national forest wealth of the country. **The Forest Conservation Act (FCA)** was updated in 1988.

However, it may be pointed out that the Forest Conservation Act applies to whole part of India except J & K.

CHAPTER 8

Degeneration of Environment in Kashmir Valley : Need for immediate Awakening

DR. M. AFZAL WANI*

THE PERSPECTIVE

The most undesirable outcome of the modern developmental pattern and industrialization is the problem of environmental imbalances. It has posed an alarming threat to the existence of life itself. The problem which was once, in a peculiar form, confined to few places has now spread over deep to the ocean depths and high up to space. Man is now more worried about the environmental equilibrium than ever before. The scientists and the technologists are yet to fully gauge the extent of the problem and seem to fail to provide means to protect human beings with other animate and inanimate associates on earth in their natural order. The outcome of the various international conferences, seminars, symposia and public debates has till date proved too small a measure to curb the evil. What can be expected from WTO, will be too early to say something about a vital issue. The deep concern sometimes shown by the advanced countries is mostly politically motivated and dilutes with similar considerations. Economic considerations also often go against environmental consciousness. It can be said with certainty that at global level an internationally motivated move can alone help in resolving the environmental issues. To ensure the same at local levels there has to be a move to develop schemes to be operated

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through public cooperation. Mere legislations cannot be found effective; moral standards, economic security and the social behaviour have a major and significant role to play in this respect. Since the problem of pollution has, besides affecting the health of the people, caused general unrest at all levels in all the corners of the world, there is a need to highlight the issues farther without suppressing the information about its dreadful consequences. In this paper we confine our focus at local dimensions of the problem in Kashmir Valley and articulate certain suggestions for further consideration and implementation.

ENVIRONMENTAL OUTLOOK OF KASHMIR VALLEY

Invariably called as the "paradise on earth", the environmental set up of Kashmir valley is to some extent stable but not in its original natural order. Deforestation, unplanned constructions, fossilization of animal races and neglect about the maintenance of rivers, lakes and streams are some basic issues that need immediate attention.

The valley, with Srinagar as its capital city is all around surrounded by beautiful mountain ranges laden with forests. On its surface are green cultivated fields, lakes, springs, rivers and smaller hills. The biggest river is the Jhelum passing down the whole valley from its source Verinag at the top. There are some other smaller rivers, canals and streams. The well known lakes of Kashmir are Wular, Dal, Anchar and Manasbal. Some lakes in the mountain terrains of the valley have won global fame. These are Kaunsarnag, Neelnag, Sheshnag etc. It is near to these rivers, lakes and mountain terrains that the famous tourist places of valley are situated. Pahalgam is situated at the banks of the River Lidder and the Mughal gardens spread around the Dal Lake. The other places like Daksum, Kokarnag, Yusmarg, Sonamarg, Aharabal, Manasbal etc. carry rivers or lakes in their laps. Some more places to be mentioned are hill tops like Gulmarg, glaciers of Lidder Valley and Sonamarg, besides different gardens dotted with magnificent Chinars.

Generally the climate is pleasant. In winter the hilly areas remain covered with snow and the plains receive frequent rain-fall or snow fall. In the previous years there has been report a major reduction in the rainfall as well as the snow fall.

The people of the valley live in compact towns and villages with agricultural lands around. In rural areas there is much dependence on surface water. Rice is the main cereal grown here. The common fruits of the valley are cherry, apple, pear, apricot, walnut and almond. The valley is not industrialised in true sense of the term. The main industries are agriculture, handicrafts and tourism. So the economy as well as the beauty of the valley is "nature dependent", which needs to be preserved.

The degeneration in environment

Industrialisation

As is evident from the above, the Kashmir valley is not highly industrialized, though some smaller establishments are existing. The threat to the environmental equilibrium, therefore, flows from sources other than mechanical adventures. It may, however, not be ignored that few cement producing plants have been established in the valley. The people of surrounding areas rightly opposed these establishments on the ground of air and noise pollution. But ultimately they had to surrender their demands and accept jobs in those establishments as a "compensation". To talk of confining these establishments to hilly areas is not the solution of the problem. That practice will not only mean the end of precious wildlife of the valley but will also prove an inappropriate measure to pollute the whole valley during the course of time. The industrialisation of the valley should be selective, both in its kind and extent. To determine the limits there should be a survey conducted through expert agencies.

Water safety

Pollution of water is the most pressing issue from the environment point of view, because now almost the water of every river, stream and lake is unsafe for drinking and the schemes of supplying drinking water are deficient as well as they have not yet reached all the people of the valley. So the problem of water pollution attains serious dimensions when there is no proper system of supplying drinking water on scientific basis. No reliable mechanism of water purification is presently existing in the valley. There is, however, further putrefication of water taking places

locally because the people residing near to the rivers, canals and streams or in houseboats use no proper sanitation methods. Use of anti-weed chemicals for agricultural purposes and many other pesticides also add to the problem of pollution.

The water resources of the Valley mostly lie in the hill ranges and people mostly depend on surface water. To continue unabated encroachments on the mountain tracks and use the hill stations for industrial establishments is therefore, in no case advisable.

Tourist industry

Now the question that warrants our attention is that whether the hill stations of the valley can be used as tourist places or camping cites. If so, how? This is also ordinarily not safer. It should be a very careful operation with specialised modalities. The human disposal of these places washed away by frequent rains into rivers and streams has many times led to the spread of viral diseases like jaundice and other disorders taking many lives. In this respect the frequent newspaper reports about abdominal disorders in Salar, Kular, Kangar etc. in the Lidder and Sind valleys need to be kept in mind. Also the construction of roads leading to hill stations or building residential establishments and markets in such places can cause much forest loss, a problem which cannot be ignored for long. In such situations the existing green wealth will be a better gain.

Special mention of the Dal lake will not be out of place here, which supports a huge population in and around it. Its importance is obvious from its location in the vicinity of the city of Srinagar, having the most beautiful Mughal gardens on its banks. On its waters it carries hundreds of houseboats accommodating a large number of local population along with tourists from various places; the former earning their living and latter enjoying life. But, in return they only pollute its water and fill it with dirt and filth. Encroachments upon its surface and the drainages it receives are quite intolerable. It is quite understandable that once a vast fresh water lake, the Dal lake is now likely to get shrink into a sewage pond or a cess pool. It will be no more available for use as a tourist place. The aquatic life in the Dal lake has substantially got reduced in quality as well as quantity. Instead, the vulgar growth of weeds has quickened the process of its shrinkage.

The Anchar lake has materially turned blind. The potential of Wular and Manasbal lakes is not being properly realised. The aquatic life, both animals and plants, in these water bodies should be studied as well as preserved. The value of this wealth should be understood in true terms.

The other activities that are posing a substantial threat to the existing ecological balance in Kashmir are: the deforestation, uncontrolled establishments and the unskilled townships. These problems are aggravating continuously. If not checked now, these problems will ruin all the natural resources and outlook of the valley turning it into a desert. Then only the floods or the drought will be a regular phenomenon in the valley.

Air and noise pollution

Some aggravation in the air and noise pollution is also being reported from the valley. The major pollutants and irritants are the dust and noise from vehicular traffic, brick kilns, husking machines, high pitched record players at public places and local small scale industrial units creating damaging vibrations. The vibrations are very harmful for the body and mind of the people living nearby, though its sound is not audible. The *infra* sound, having a frequency of below 30 cycles per second and thus inaudible to the human ear, is still capable of impairing the human organism. Many shell industrial establishments have been settled in the valley and many private mills are also in run. Though these may be turning at a slow rate but these generate *infra* sound. The *ultra*- sounds can also not be heard by human ear, but these can cause greater damage to human body.

Noise builds up nervous tension, kills sleep, causes sometimes mental collapse, increases the chances of heart failure and makes one quarrelsome. Animals are equally susceptible to the effect of noise. It is said that by noise "rats lose their fertility and eat their young ones."

Remedial measures

Life is not possible at all places in all situations. It needs favourable circumstances and a balanced ecology. As a matter of fact, a place can sustain life only within certain ranges of adaptability. If imbalances continue to take place and the potential for

adaptability gets reduced, the life will, as a natural consequence, get adversely affected. Thus, we need to be conscious about the above mentioned threats of environmental imbalances in the Kashmir Valley. In this respect some remedial measures are, suggested for consideration and further debate and implementation.

1. Traditional consciousness of the people of Kashmir Valley about environment needs to be reawakened as in the past they have shown least interference with nature.
2. People must be educated about modern scientific methods of sanitation, sewage disposal and processing of the waste matter.
3. The deforestation going on must be immediately stopped and the process of forestation vitalised.
4. The protection of wildlife must be ensured.
5. Establishments of industrial units must be permitted only after taking a note of all the relevant queries about the protection of environment and the primary thrust must be on silk industry, handicrafts, information technology, generation of electricity, agriculture etc.
6. There must be only a regulated and controlled township at urban and local levels.
7. Encroachments upon parks, lakes, rivers and streams must be stopped.
8. Houseboat-owners must be forced to adopt safer and special methods of sanitation to prevent water pollution and the de-weeding of lakes must be a regular affair.
9. To prevent air and noise pollution on roads and other public places, proper guidelines should be adopted. Playing of musical instruments at high tone at public places should be discouraged and noise producing machines should be installed under the ground.

Lastly, it may be again pointed out that the man must be reminded of his traditional behaviour with spiritual inclinations so that his hidden environmental consciousness awakens again. The importance of laws can, of course, not be ignored but the above mentioned measures can ensure their enforcement better. Further, there is a need to examine the existing environmental laws afresh and a set of comprehensive legislations should be adopted taking a due note of the new dimensions of the problem.

CHAPTER 9

Major Environmental Issues in Kashmir

PROF. S. BHATT*

PATH OF ENVIRONMENTAL SCIENCES

A study of environments in Kashmir and elsewhere calls for a new approach to environmental sciences. It combines the study of laws of nature and ecological systems in Kashmir Valley. It also aims to produce sustainable development which is a positive concept and depends upon the application of sciences in harmony and collaboration with nature. We are reminded of Einstein's address in honour of Max Planck in 1918 when he defined the motivation for the study of science. Einstein said: "The Temple of science is a multi-faceted building. In it, many engage in science out of joy in flexing their intellectual muscles, or for utilitarian ends..." Modern concept of sustainable development no doubt is a joy of scientific research as we are dealing with the nature and ecosystem. The whole of biosphere indeed is open for a new study of relatedness of various laws of nature. An ecological and biological approach to science and law has produced a new paradigm in science. And we are aware of this new scientific path which has been opened by many international covenants and declarations made by the United Nations, such as the World Charter for Nature (1982) etc.

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SPECIAL FEATURES OF KASHMIR'S

Ecology and Environments

In our concern for environment protection and sustainable development in Kashmir, we have to highlight some special features of this valley. Indeed a leading scientist of India and a colleague in the School of Environmental Sciences in Jawaharlal Nehru University calls the entire Kashmir Valley as an important biosphere reserve. The United Nations has held a conference on man and biosphere programme. Professor P.S. Ramakrishna advises on the importance of these reserves for the protection of biosphere. There are 301 reserves listed by the UNESCO world over which are also testing areas for sustainable approach for development. As a Man and Biosphere (MAB) study of IUCN points out, biosphere reserves help in conservation of ecosystems and genetic resources, monitoring and research, and providing facilities for education and training. Biosphere reserve include scientific nature reserve, parks, natural monuments, wildlife sanctuary, cultural heritage landscapes, multi-use management areas, natural biotic areas, historical archaeological areas, and, world heritage sites. There are 14 biosphere reserves in India. Beyond some studies made by scholars from forest departments, no overall ecological study seems to have been made of Kashmir environments. There are good number of research works on 'the Himalaya mountain ecology by India and by the United Nations. At Kathmandu in Nepal and in Almora in Uttaranchal, Ecological Institutes have been set up for study and research of emerging problems of regions in Himalayas. However, so far we do not have one interdisciplinary research centre in Kashmir. During my academic visits to discuss environmental issues in Kashmir in June 2003, I came across a lot of growing awareness and concern for environment protection. Many scholars would like to chart out the path and plan for sustainable development keeping in view various ecosystems in the valley. Prominent academic places where environmental studies are conducted include Kashmir University's Department of Environment, where Professor A.R. Yusuf has a large number of projects in hand; Post-graduate Department of Environment in S.P. College, and the State Pollution Control Board located in Raj Bagh area which has some research scientists employed. S.P. College is a historic institution. It is celebrating

its centenary year in 2004. The Principal, Dr. S.G. Sarwar is a distinguished environmentalist. The college has an excellent laboratory for environmental research. I had occasion to discuss with Dr. Sarwar regarding setting up of a new centre of excellence for environment education in S.P. College with the assistance of the Ministry of Environment and Forests, Government of India. This Ministry has already established such centres in Ahmedabad, Chennai etc. A proposal to this effect from the Department of Environment, Jammu and Kashmir Government to MOEF, Government of India will be very useful in the overall interest. It will save and protect Kashmir environment for future, and provide guidance for sustainable development. To nominate the whole of valley as a biosphere reserve will be an important consideration for the overall scientific and economic purposes.

Some Problems of immediate Environmental Concern

Kashmir is located in 32° to 37° N latitude and 72° to 80° East longitude. It has an area of 222236 sq. km. including 78932 sq. km. Pakistan-occupied and 5180 sq. km. with China. Kashmir forms part of Western Himalayas. The valley area is 150 km. long and 42 km. wide. Rainfall is mostly in winter months. 65% people work on agriculture, 85% live in villages, and 23% of land is used for cultivation. 61% of land is under forests (See, S.K. Chadda, *Ecology of Kashmir*, 1990). Seven wetlands are being developed in Jammu and Kashmir state which include Wular lake in the valley. Kashmir has a unique biodiversity reserves of forests, wet lands, flora and fauna.

Most of the urgent environmental problems are due to air pollution, water pollution, land degradation, forest depletion and increase in population. Air pollution due to vehicles has become an urgent health hazard.

In Srinagar, private vehicles have increased and roads are choked. Enforcement of air pollution standards is an urgent necessity. There are increasing cancer cases. Courts have an important role in this respect. New eco-clubs have been established for conservation and environment protection. Public interest litigation is needed to clean the valley like the Dehradun Valley. The new project on Dal lake was a result of Court order based on public interest litigation.

Regarding water resources: a new policy is being drafted to provide clean water to people and arrange for drainage systems. Along with clean water supply, the disposal of sewage by public bodies needs a citizens' movement. Recycling of sewage will provide new sources of manure and energy. Removal of biomedical waste has become important for which purpose, the State Pollution Control Board has prepared research works.

The natural reserves of Dal lake, Wular lake, Anchar lake are some unique features of Kashmir's natural heritage. A new policy is being evolved to protect these lakes from erosion and human encroachment. There are estimated one and a half lakh people in the catchment area of Dal lake alone. There are 18 more lakes situated in the upper areas of Kashmir valley. About them not much is known regarding their environmental status.

Eminent Writers

To understand the issues of environment of Kashmir we have to refer to great writers, poets and historians. In modern times poets like Mehjoor, Zinda Kaul have inspired us on the harmony of Kashmiri people with the natural environments. Mehjoor's following poem is a reminder to the global environment movement: "Wulu ha bagbano nav baharuk shan pada kar, khilan gul ghat karan bulbul, thee Saman, pada kar", meaning "come O Gardener, create a new consciousness of spring, when the flowers will bloom, and the bulbul will dance". Kalhanas Rajtarangni is also full of references to "shrines, temples and monuments of Kashmir". He was not only a historian, writes R.S. Pandit, but a great artist and poet. Professor Agha Ashraf Ali has also in our times contributed substantially his thoughts on environment protection of Kashmir.

In recent past, Samsar Chand Kaul wrote a book "Beautiful Valley of Kashmir and Ladakh", 1942. Kaul was a teacher of natural history, writes C.E. Tyndale-Biscoe in his foreword. This book is worth any price being a true reflection on the environments of Kashmir valley. Some of the chapters are on Gulmurg valley, valleys of Pansal range, Konsar Nag lake, Liddar and Sind valleys, Wardwon valley, Pahalgam valley, Gangbal lakes, Erin valley, Gurais valley, Wular lake, wild animals monasteries etc. If we are to map the ecological systems of the valleys mentioned

and protect historical monuments, Samsar Chand Kaul is the guide. Similarly Ram Chand Kak wrote an excellent book on "Ancient Monuments of Kashmir", 1933. Some of the monuments he describes are Shankaracharya temple, Khangah of Shah Hamdan, Patter Majid, Tomb of Zain-ul-abidin, Jama Masjid, Hari Parbat Fort, Mughal Gardens, Harwan excavations, Pandrethan, Pampur, Avantipur, Martand, Vernag, Patan, Manasbal, Gurur, Wular lake etc. A. Foucher writes in this foreword to Kak's book that the charm of Kashmir environment is due to combination of a mysterious life of nature and an artistic landscape. Foucher writes: "Personally, I have often thought that there remains more classic antiquity still living in the shadowy heart of the Kashmir jungle than in the theatrical scenes of the Mediterranean shores". On Wular lake, a writer in this seminar namely, Nahida Assad Basu has made a study of Wular lake as her thesis for Master's degree in ecology and environment. She has a good description of the geography, geo-economic aspect and historical monuments situated in and around this lake. New avenues for tourism, fisheries, power generation are discussed. Her work was guided by Mr. M. Sayeed, an outstanding engineer, and calls for study by experts.

No wonder that the Government in Kashmir is keen to protect the heritage of Kashmir Valley as we cannot let it go down the history. The temples and mosques are being repaired. Khir Bhawani and Mattan Temples along with some shrines have been given grants recently for repairs. Besides, eco-tourism to places like Amarnathji, Char-e-Sharif etc. will help economy in the State. Among writers, Mr. Jag Mohan, Honourable Minister of Culture, has made a formidable attempt in his book "My Frozen Turbulence in Kashmir" to describe the links of glorious past with the present, and drawn a hopeful view of future of Kashmir based on harmony. Finally, Walter R. Lawrence published his master piece book in 1895: "The Valley of Kashmir" that provides us an objective and creative account of Kashmiri as a people, their multi-cultural heritage, flora, fauna, archaeology and social life. Lawrence's is one of the best-published works on Kashmir.

A New Vision

I am sure that this seminar will help provide a new vision which is needed to plan and safeguard environments in Kashmir.

The experience of other States in India and the wisdom contained in global environmental laws are useful reference works. Some important ideas include the following: First, that we adopt an integrated approach to our environmental planning and coordination. Second, we develop a new vision for eco-cities and towns of Kashmir where population and natural resources are balanced. Third, we promote a study of various ecological systems of different valleys like Gurez, Lolab, etc. Fourth, we identify some biosphere reserve areas as are being mentioned like Dachgam in Pahalgam, and Gulmarg areas. Even Gurez valley calls for a new study for its biodiversity resources. Fifth, centres of excellence and eco-clubs, and more urgently, a Centre for Environment Education in S.P. College need to be set up to frame overall programme for environment protection and sustainable development. Sixth, enforcement of laws is needed by people and government to check pollution of air, water etc. Seventh, the ecology of Kashmir being fragile, there is need to monitor the state of environment in Kashmir. Annual reports are needed. Eighth, an integration of law and science is necessary to establish harmony with natural ecosystems. Ninth, we promote a cooperative federalism with adjoining States to avoid degradation of environments. Cooperation based on federal approach goes well with ecosystem approach to natural resource management. And lastly, a movement has to be nurtured for harmony with nature and in society. Poet Mehjoor's poem cited earlier should be inspiring indeed.

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ENVIRONMENT : MEANING AND SCOPE

Oxford Advanced Learner's Dictionary defines environment as "the conditions that affect the behaviour and development of the physical organism; the area or a physical surroundings forming environment." This is ecology, environment not affect a single behaviour, life is a lot of things. For that, proper environment will through the people with, good people in environmental condition will make good and development. natural activity around human environment will provide, good, economic growth, and good climate environment will good and better. So environment is the best look of all development leading to development of educational, political, society, science and maintaining quality educational institution. Therefore, the important role of environment through the culture of people development many

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CHAPTER 10

Education and Environment Protection in Kashmir

PROF. M.L. WALI*

The author in this article discusses the environment meaning and scope. Explains the environment pollution and other thrusts: Highlights importance of education and environmental awareness. Stresses for providing environmental education at all levels upto University and research level. Finally throws light on environmental scenario in J & K state. Concludes with suggestion for better future of the state after checking environmental pollution and ecological pollution.

ENVIRONMENT : MEANING AND SCOPE

Oxford Advanced Learners Dictionary defines environment as "the conditions that effect the behaviour and development of the physical conditions that exists in a pleasant working or learning environment."¹ Thus an unhappy environment can affect a child's behaviour, like a fish out of water will die, proper environment will flourish the productivity, good political environmental condition will create good and dependable political activity, sound financial environment will provide sound economic growth, and good climatic environment will yield good harvest. So environment is the bed rock of all developmental activity, in development of educational pattern, training, systems and establishing quality educational institutions. Therefore this important role of environment demands the creation of separate department/Ministry

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of Environment and Pollution; which would establish the complete structure within which a user, a computer or programmer operates. It will also control the conditions that nature has provided from, getting it polluted by men, state or so-called developmental activities.

Its scope concerns also other natural and man modified features which constitute the totality of our surroundings. Man is at the centre of ecosystem and is inextricably interwoven with it in an organic relationship. So environment can be defined as aggregate of all external conditions and influencing affecting the life and development of organism, human behaviour or society. Four broad categories of environment influencing the human behaviour are physical, chemical, biological and social environment. Thus environment is the combination of many other concepts, which include political, cultural and economic problems of far reaching consequences.

Environment pollution and other Thrusts : The process of making air, water, soil, ecosystem dirty is known as air pollution, water pollution, soil pollution and eco-pollution. Similarly deforestation, disturbing ecological balances, change in animal habitat and natural atmospheric and noise level conditions are known as environmental and noise pollution.

The study of environment thus not only deals with system concept, resources and pollution, it also encompasses human ecology, population and control, environmental policy and management, environmental law, environmental economies and sustainable development. For self-sustaining development within a nation and throughout the world, keeping in mind a futuristic perspective, the ostensibly conflicting claims of ecology, environment, energy, economics, management, equity, ethics and efficiency have to be reconciled and harmonized for common good and common future. To establish a harmony with nature is a multi-dimensional phenomenon where we need collective wisdom from various disciplines, an inter-disciplinary approach to solve the complicities of environmental problems, being the most undesirable outcome of the modern civilization pattern and industrialization and posing an charming threat to existence of life itself.²

To ensure his will being human being has to produce an ecological balance between himself and his environment. He is

himself responsible for endangering his environment, by his own activities like deforestation, changing agricultural practices, industrialization, urbanization emitting uncontrolled smoke from motor vehicles, industrial discharge into drains, rivers and making garbage stores on sides of main roads.

The state of Jammu and Kashmir, which was known for its clean environment, dense forest, lush green pastures, springs, lakes, huge glaciers is fast losing its paradisiacal charms due to environmental changes. Abrar Hasan Khan and Ashok Kumar Pandit³ in their publication *Ecology, Environment and Energy*, have given statistical figures about environment pollution. Dal Lake has shrunk from 25 sq. km. to 10.25 sq. km. till 1996. 3770 kg. of phosphorous and 30300 kg. of Nitrogen are added annually to the water body through city's sewage, forest area of state has reduced from 14,858 km. in 1961 to 12773 km' in 1971 to only 10.207 km² in 1981.

The realization has started an awakening world over about the responsibilities of the humanity towards the preservation of environment and ecology for our posterity. From the European conservation year of 1971 and the United Nations Conference on Human Environment. Stockholm (1972), the concern has grown into a global movement and the year 1993 saw the world conference on Earth Summit in Rio-de-Jeneiro, bringing together heads of all states, with declaration expressing serious concern about the environment degradation at the global level together with suggestions and recommendations for alternate technologies as well as corrective measures. Only a balance between technosphere and biosphere can ensure greater environmental protection and therefore, longer sustenance. Today "Save Earth" is a slogan and world-over 5 June is observed as Environment Day and 5-11 June as World Environment week every year to highlight the duties of world population of their duties and responsibilities towards protection and preservation of environment.

Education and Environmental awareness

'Man is both creature and moulder of his environment, which gives him physical sustenance and offers him the opportunity for intellectual, material and spiritual growth. Man has acquired the power to transfer his environment in many ways and on an

alarming scale. It is earnest desire of the human society to strive for preservation and improvement of Human Environment for the benefit of entire humanity. Education is one the most effective way to accomplish the urge and need of the people.

The World's techno-social environment demand the effective role of educational system right from primary level to University level to create awareness among/present generation to know their responsibility, obligations and rights for maintaining, preserving and improving natural environment free from all types of pollution discussed earlier.

Our education system must be environmental awareness oriented. All those who are not informed about the prevention and control of environmental pollution must be provided with this information, so that they may be able to appreciate the consequences. A comprehensive course on human environment must be devised and included in the curriculum of students from very beginning, so that society is made environmental conscious, by providing effective media of moulding the behaviour of the society towards environment.

Environment Education

To overcome the problems of environmental ecosystem and environmental pollution, the common man in general and those who are involved in its protection need proper education through starting regular courses of environment at graduation and post-graduation level: in collages and universities all over India.

Education has a major role in implementing nature conservation and environmental protection. This is essential for the primary health care of the humans, animals and plants. This in turn demands "enactment of Environment laws for enforcement of its protection. All this can be achieved if we develop proper environmental courses from school to University level education. The environmental education must cover all aspects of man physical, mental and social well being.

The aims and objectives of the environmental programme and awareness should cover:

- (a) Awareness of and sensitivity to total environment by making people conscious of the importance of environment.

- (b) Application of universally accepted concepts to promote understanding of ecological processes.
- (c) Study of ecosystem to provide basic knowledge and understanding of our knowledge.
- (d) Develop knowledge building skills like critical observation, analysis of data collected, circulation of results, and work effectively to implement findings.
- (e) Comparison of results of different areas and different surveys conducted there.
- (f) Enactment and enforcement of environment Acts and laws. Involvement of voluntary organization, mass media, print media, electronic media with institutions providing environmental education.

Environmental Education Scenario in Jammu and Kashmir State

The state of Jammu and Kashmir is one of the forward looking states in India, which care for environmental development programme and have initiated environmental education system right from under-graduate level to post-graduate level. Among the colleges, S.P. College has provided B.Sc. programme with environment and water management.

The University of Kashmir⁴ in its post-graduate teaching programme has provided different courses as mentioned below:

1. Environment laws as one of the thrust areas in research level programme of law department.
2. Environmental biochemistry as one of the trust area in research level programme of Department of Biochemistry.
3. Environmental geo-sciences as one of the papers in M.Sc. final year programme in Department of Geology and Geophysics.
4. Environment, Health and Development as one of the thrust areas in research level programme of the Department of Geography and Regional Development.
5. Introduction to the study of Quran : Hdith and fiqh or Islamic: thought: man and environment as, a second paper in MA previous level.
6. Environment science as one of research areas in research programming of Centre for Research for Development (CORD).

7. Departmental Environmental Sciences as full-fledged post-graduate Department with following programme at M.Sc. Previous and final level

Academic Programmes

Programme Offered	M.Sc.
Duration	Two years
Intake Capacity	10 + 2 payment seats
Eligible Criteria	(1) B.Sc. with any three of following subjects: Botany, Bio-Chemistry, Chemistry, Zoology, Geology, Geography, Maths. Industrial Fish and Fisheries, Sericulture, Environment and Water Management, Mushroom Cultivation. (2) B.Sc. Agriculture. B.Sc. Fisheries, B.Sc. Forestry.

Courses Offered

<i>Previous</i>	<i>Final</i>
(a) Fundamental of Environmental Science	(a) Microbiology and Public Health
(b) Natural Resources	(b) Environmental Conservation and Biotechnology
(c) Environmental Chemistry and Eco-toxicology	(c) Environmental Engineering. Remote Sensing and System Analysis
(d) Environmental Pollution	(d) Resource Management
(e) Laboratory Course I (Based on Paper (a) & (b) above)	(e) Project Report
(f) Laboratory Course II (Based on Paper (c) and (d) above)	(f) Laboratory Course III (Based on paper (a) and (b) above)
Research Degree Offered	M. Phil and Ph. D

CONCLUSION

Education being one of the most important and effective media of moulding the behaviour of society, by employing the

lateral transmission techniques, we may be able to generate environmental consciousness among the members of our society. "Modern techniques of education will prove beneficial to overcome the environmental illiteracy among our society. The members of our society will not only enjoy clear blue sky, fresh sweet water, lush green forest, but also may be able to appreciate their rights and duties, vis-a-vis the human environment and its protection, preservation and conservation. Further they may definitely shirk from the ways and means which may lead to environmental pollution, consequences of which are destruction of man, material and money.⁵

The author draws satisfaction by the measures adopted by the Government of J&K to control Dal Lake pollution and encroachment, stoppage of deforestation and plantation of trees in forests, enactment of laws to control environmental pollution by banning discharge of the chemical waste of industries in fresh water rivers. Government of India and Supreme Court deserves praise for checking pollution in the Ganges and Yamuna rivers and punishing industries like Union Carbide Industries in Bhopal for creating great human loss. Let us hope the society will become aware by these hazards better late than never.

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Education and Environmental Protection in Kashmir
 In the present time, the role of education in environmental protection is becoming increasingly important. We are the only hope for the future of our society. Modern techniques of education will prove beneficial to our society. The members of the environmental minority among our society. The members of our society will not only enjoy their life, but also may be able to appreciate their rights and duties, view the human environment and its protection, preservation and conservation. Further they may definitely contribute from the ways and means which may lead to environmental pollution, consequences of which are destruction of man, material and society.

The author draws attention by the measures adopted by the Government of J&K to control the pollution and environmental degradation of the environment and protection of trees in forest. enactment of laws to control environmental pollution by banning discharge of the chemical waste of industries in fresh water rivers. Government of India and Supreme Court directives for checking pollution in the Ganges and Yamuna rivers and providing industries like Union Carbide Industries, Hindalco for creating great hazardous. Let us hope they will be more aware by these hazards than they are now.

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CHAPTER 11

Dal Lake—The Dying Marriage

P.N. KACHWA

Who has not heard of the Vale of Kashmir and its myriad fresh water lakes, especially the well known Dal Lake that occupies

Part III (Post-lunch Session)

PRESENTATION OF PAPERS

the general Indian atmosphere, gave into the very spirit of beauty and environment by creating a world and introducing in the phenomena of Nature. The lake, which has been a part of the life, for its greedy and selfish work, showed the development around the lake in such a manner that the industry and growth of wealth can save it from its extinction. The only hope is within the transformation of the spirit and psyche of the people here itself. If it chooses to stand and continue in general as then they themselves shall have to rise to the occasion and be ready for any action to save their beautiful environment. It is mainly a duty to extend an other agency, with its previous control and leaders, including official agencies, to save the situation. Such agencies might prove supporting only to the popular action and initiative. It is exclusively up to the population to decide whether to be or not to be.

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Part III (Post-lunch Session)

PRESENTATION OF PAPERS

CHAPTER 11

Dal Lake—The Dying Heritage

P.N. KACHRU*

Who has not heard of the Vale of Kashmir and its limpid fresh water lakes, especially the well known Dal Lake that imparts fame and freshness to the environs or its capital city of Srinagar. It is this very abode of ideal happiness that is now in the very jaws of its extinction. The "Dal is Dying"—that is the general cry which was first raised by the well known architect, Sudhir Vohra as back as in August 1981, but I declare it is already dead and that too due to the very swarms of it's over population, that like the general Indian phenomenon, gnaws into the very vitals of beauty and environment by creating anarchy and disbalance in the phenomena of Nature. The overcrowding and affluent populace has, for it's greedy and selfish ends, denuded the environment around the lake in such a manner that no authority and amount of wealth can save it from it's extinction. The only hope lies within the transformation of the spirit and psyche of the populace itself. If it chooses to exist and continue its generation then they themselves shall have to rise to the occasion and be ready for any sacrifice to save their breathing environment. It is merely a farce to expect any other agency, with its pronouncements and fanfare, including official agencies, to save the situation. Such agencies might prove supporting only to the popular action and sacrifice. It is exclusively up to the populace to decide whether "to Be or not to Be".

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On the spot inspection and observation reveals that the vertical and rugged face of Kaplas causes the denudation and brings down silt into the lake that extends the shore and gives birth to the expanding marsh from the north-eastern shores. The process has a quick tendency of its linkage with the floating Gardens fast being expanded by the greedy-occupants from the western fringes of the lake. Thus the lake faces the danger of division into two smaller ones, one on the north-western side and the other on south western side. Supporting to this division the existing footpath from western shore (Rainawari) to Nishat garden adds to this activity, especially the bifurcation nearing Nishat that cuts off the front lake area to the garden, which has almost changed to a marshy expanse. Further down, the lake area from Dal Gate point to Nehru Park is already reduced to a narrow canal due to the expansion of land tentacles. Besides this the area of the lake is heavily moored by gigantic and massive house boats which add to the contamination activity and placidness in water that in turn becomes a reason for further expansion of land projection. The intensive tourist occupation and associated human activity facilitates the dumping of garbage for the expansion of landmass tentacles. The luxurious and palatial house boats have grown in fantastic numbers and are adding further at an alarming pace that their present expansion can easily cover the water expanse, and at the same time a means for violation to the landscape and the habitat. This activity is fast building up the pressure, and onslaught of human activity on the lake area that adds to the process of contamination and marshiness. The burden of human refuse caused through the over indulgence and orgies of tourist traffic, adds to the activity of dumping along the moorings which increase attachment and extension to the land tentacles right into the lake expanse. The tourist garbage, refuse and night soil, not only raises the bed but also contaminates the lake waters which in olden days used to be coveted as an Elysian drink by its neighbours and the localities around. Now the Dal waters offer nothing short of infection and disease.

Through the years of official and governmental neglect and lack of supervision, the unscrupulous population inhabiting the near-about of the western fringes of the lake extending north to south, has been greedily and constantly infringing upon the waters

firstly by extensions of floating lands and latter consolidating it by earth, and then further repeating the process. This process has eaten away the main water body of the lake and also separated from it the main expanse of Nagin lake. The tendency of infringement all around the lake has been found actively operative, although it is alarmingly present in the area under discussion. It has been observed that the greedy usurpers in their defence put forward the theory of productiveness of the produce that is presumed, according to them, to be the main green source for the sustenance of the local population. This is a false facade created by the business tycoons for their profiteering through meagre investments as it does not cost much for incursions into the lake waters. Through centuries it has been the back waters of the lake and the areas adjacent and around the city including the moist land semi-marshy areas far extending south and west and on north extending around the lands and marshes of Anchar lake that abound in profusion and plenty, the green and vegetable productions in surplus and for consumption of the entire population. Besides, the city itself abounded in vast expanse of vegetable production. Now these very areas have been converted into concrete jungles. In addition the contemporary commerce has given a phenomenal boost to the influx of green vegetable supplies and has greatly added to the local production.

The eastern shores with its northern extension are fringed with the massive ramparts of Kaplas-Zabarvan mountain range. Its vertical face through which denudation has through ages formulated an incline and semi-table land formation at the foothill that, instead of having been ideally afforested, has been through years invaded by the affluent population that has been greedily bounding the slopes for residential and commercial constructions, thus leaving hardly any scope for its afforestation. Additionally, the forest lessees have penetrated deeply with their deforestation and devastation of habitat, and have much before got extinct the famed Kashmir Stag (Hangul), Snow Leopard and Musk Deer. The whole stretch of mountain foot has been cancerously scarred with terraced clearings, residential and commercial constructions, three- to five- star hotels, guest houses and restaurants besides shoplines, dhabas and fruit and vegetable market that leaves behind nothing but garbage, packing wastage and plenty of non-

degradable polythene and plastic materials. On the one hand the non-afforestation, and on the other the deforestation activity caused by the population onslaughts on these fringes and slopes, the under-bed and coastal oozing and numerous springs are last drying up and thus contributing to the low level and contamination of water. The activity of discharge from this horde of affluent intruders into this ideal locale has menacingly infected and venomised these whalers which in the past were the source of health, energy and refreshment.

The shore line of the crystal waters of Nagin lake has already experienced a serious threat from the advancing residential population that, not only has pointed the lake waters but also has denuded the famed landscape of Almond Blossoms on and around the slopes of Sharika Parvat (popularly known as Hari Parvat) and also on the western shore of Nagin lake.

Mahasarit, popularly known as Telbal Nala from the north flowing through Harwan gorge, is the main feeding discharge in the lake from the fresh Himalayan glacial lake of Tarsar-Marsar. This stream also is confronted with rising sand beds around Telbal village area and also the creation of siltation delta at the discharging point.

An over all view of this prospect leads towards the only one and impossible way out for the retrieval and solution, without which I must declare not that "the Dal lake is dying", but the Dal lake is already dead.

So there is no alternative but

- To vacate and clear all the intrusions of land formation and occupation, extensions of floating lands and siltation.
- The removal of the portion of the footpath stalling from the lower Ishbar village upto the joinder with the main footpath. This will extend the free movement of waters into the Nishat front. The main footpath from Nishat to Rainawari to be well maintained with willow afforestation and upkeep, of seven bridges which link up the northern and southern portions of the lake. The footpath conveys the main supply of water to old city therefore, it being essential for its existence. The stoppage and clearance of the whole footpath for concretising is highly essential.

- Clearance of the whole incline, slopes and terraces of the foot of Kaplas-Zabarvan range, including all the populace, their occupation and construction. This stretch has reference to the areas from Dalgate right up to Shalimar.
- The complete afforestation of the area indicated above under an official programme of the "area of Heritage" declaration.
- Clearance, deoccupation, depopulation and afforestation of all the lands and shore lines around upper western banks of the lake including the stretches around the Nagin lake.
- Deportation of the mooring and floating house boats and leaving the lake waters for free movement and fresh breathing.
- Intensive willow afforestation between the city front and the newly cleared coastline of the lake at the western shore.
- Desilting of Telbal stream and its discharging area. The constant vigil on Mahasarit From its source to the point of its discharge into the lake.
- To remove the projection on which the tourist complex and the Centaur Hotel has been erected. The area was some years back a green and afforested patch of land now paved into concrete and to construction.

Short of this there is no other alternative to save this "emerald set in jewels".

There exists constraint and stealthy onslaught on the backwaters of the lake by extending the land mass, and thus restricting the free flow and movement of the waters that is necessary for the freshness, anti-contaminatory and anti-marshy development. This leads towards squeezing the aquatic boundaries and further extending the tentacles of floating lands in the lake.

On the northern corner, right under the foot of Nishat Bagh, the activities of late Khalil Baba, who died not less than the age of hundred twelve years, remained quite active under my observation in encroaching on the water front. He owned a fruit shop that still exists on an unauthorised public land under the important centuries old Chinar; and while running the shop he remained clandestinely active in filling up the adjacent water at the north-western side.

In course of time the land projection became his vegetable garden to augment his income to the shop. The constant practice

for the extension programme in to north-east fringes of the lake, is faithfully followed by Khalil Baba's fat blue eyed son.

An alarming development towards choking the water circulation of the Lake has recently taken place on the main discharge canal that links the expanses of Nagin Lake and Dal-Kutwal. The canal, between Jogi Lanker (Rainawari) bridge and well-known Shiva Temple, for a long time, remained heavily choked with giant-size barges and boats. This slowly led to the stagnating activity and then disposition of debris generated by boat occupants right in to the canal. Thus a landmass came up right in the middle, and the boat-dwellers became the land owners and erected their ramshackle on it. The northward stagnation, marshiness and Nambal formation of the canal has already started, which very soon, is going to engulf in its fold the areas of Dal-Kutwal and Nagin Lake.

The tourism has played no less a role in contributing to the pollution and contamination of the atmosphere and physically of the lake area but also has created imbalance in the natural vista and phenomena. It seems to be a national feature of tourism to create imbalance in nature and putting the National Heritage in danger. My recent visit to Ajanta revealed that each day couple of thousands throng in to caves disbalancing the atmosphere with the blarings and heart-ravishing screeches which their transistors and speakers vibrate in to the meditative vista. It is a different thing whether the noisy and talkative Indian tourist renders his unaesthetic ear to these blarings and empty-can trumpets, while he is busy in munching his junk-food carrying in polyethylene packets, and throwing these away, after emptying, into the cataract below, wherefrom ancient mendicant would bring up the freshening water to fill in the stone enclosure that would reflect the glow on the meditative Budha. The urinating spots fringing the pathway to the caves is an additional curiosity that our national tourist has presented to the awe-stricken spectator, thronging and noisy onrush transform and thickens the inside atmosphere of the caves through their emanating odorous body temperatures which became harmful for the ancient wall paintings and murals.

Ancient and medieval forts, castles and palaces bearing the repute of national heritage, are being fast transformed into five-

star hotels, associated with commercial junk-shop, marketing plazas and eateries that help in generating garbage and non-biodegradable, plastic and polyethylene stock piles.

With all these characteristics the Tourism has in no lesser way infected the habitat and environs of the lake. It is high time for the authorities to revise over and make a thorough reappraisal of the laws, rules and regulations in order to discipline and regulate the morals and methods of the unbridled mass.

The total eradication of human occupancy, replacing it with the immediate and distant programmes of afforestation is the solitary way for rejuvenating the eruption of numberless underwater springs which are grasping for their resurgence. But the Pine and Deodar demands a long span of time and protection to thrive. Instead the immediate afforestation with Keekar results in a prosperous foliage in two years time. It helps immediately in soil retention which, in turn, gets impregnated with the rain waters, finally to ooze out through numerous underwater springs. On the other hand the shadowy foliage renders an ideal protection for the Pinus seedlings to thrive, which takes a long time to grow, but finally overtakes the undergrowth. A typical example of this afforestation lies in situation at the immediate foot of the Temple on the north-eastern slope of Shankaracharya. In the year 1944, solitary three pine trees were observed languishing for its habitat, when the then State Forest department took to this type of afforestation programme for an experimentation. Just after a gap of forty-four years in 1988 the slope presented a complete transformation into an extensive patch of dark and dense forest.

While analysing this ghastly and depressing situation, we stand in confrontation with this glaringly advancing death. We crave for its forestallment but the question "who will bell the cat", when the cat has already started whining foul, feeling the pinch and pin-prick of the publication of this paper. The state business tycoons and tourism industrialists recently argued through a news item in *Times of India* as to why the fast sedimentation of Wular Lake has taken place where there have been no moorings of House Boats. This statement of theirs reflect their gross ignorance about the geographic phenomena operating in their homeland. All of us know that there is a pronounced geological incline of

the valley, directing all its flow along with Vitasta and its many auxiliaries towards the deepest level, well known as 'Sun'-wor-the deep area, where Wular Lake is expanded. Obviously, the entire valley along with its ramparts formulate catchment area to the lake, depositing massive quantities of debris collected, and thus activating a massive siltation of the lake. According to the detailed scientific investigation conducted and funded by the World Wide fund for Nature, Switzerland, and published under the title "Wular lake" in the year 1994, which documents the detection of a massive silt-load of minimum 3,331 acre feet silt deposited in to the lake. The report further opines that "it (the lake) plays a significant role in the hydrographic system of Kashmir Valley by acting as a huge absorption basin for the annual flood waters". The report documents that "the entire Kashmir valley forms the catchment area of the Lake....." and besides the flood waters of Vitasta, the river water "also carries a large amount of untreated organic and inorganic waste from townships in its catchment"; While Erin and Madhumati streams further augment the siltation.

Thus putting forth such an argument that reflect nothing excepting ignorance, through which they try to justify their business moorings that contaminate the fresh water Dal Lake fed by its oozing springs and glacial waters of Tar Sar-Mar Sar combine. It is obvious that whichever group and political agency takes hold of the power of the state, the unavoidable noose of powerful business tycoons is destined to hang around their neck, of course with their own selfish choice and welcome gesture.

Therefore stark naked doom of death looms large over this shimmering and sprinkling prospect; and the lonely way out, as already stated, is the people's will and their upsurge that is going to save this Diamond Set In Pearls. A Chinese type of people's Cultural Revolution is needed with the aim of saving this unique Heritage bestowed by nature. It is immediate call of the hour that puts on test the bragging about Kashmiriat. Short of this there stands nothing but Death, Death and Death!!

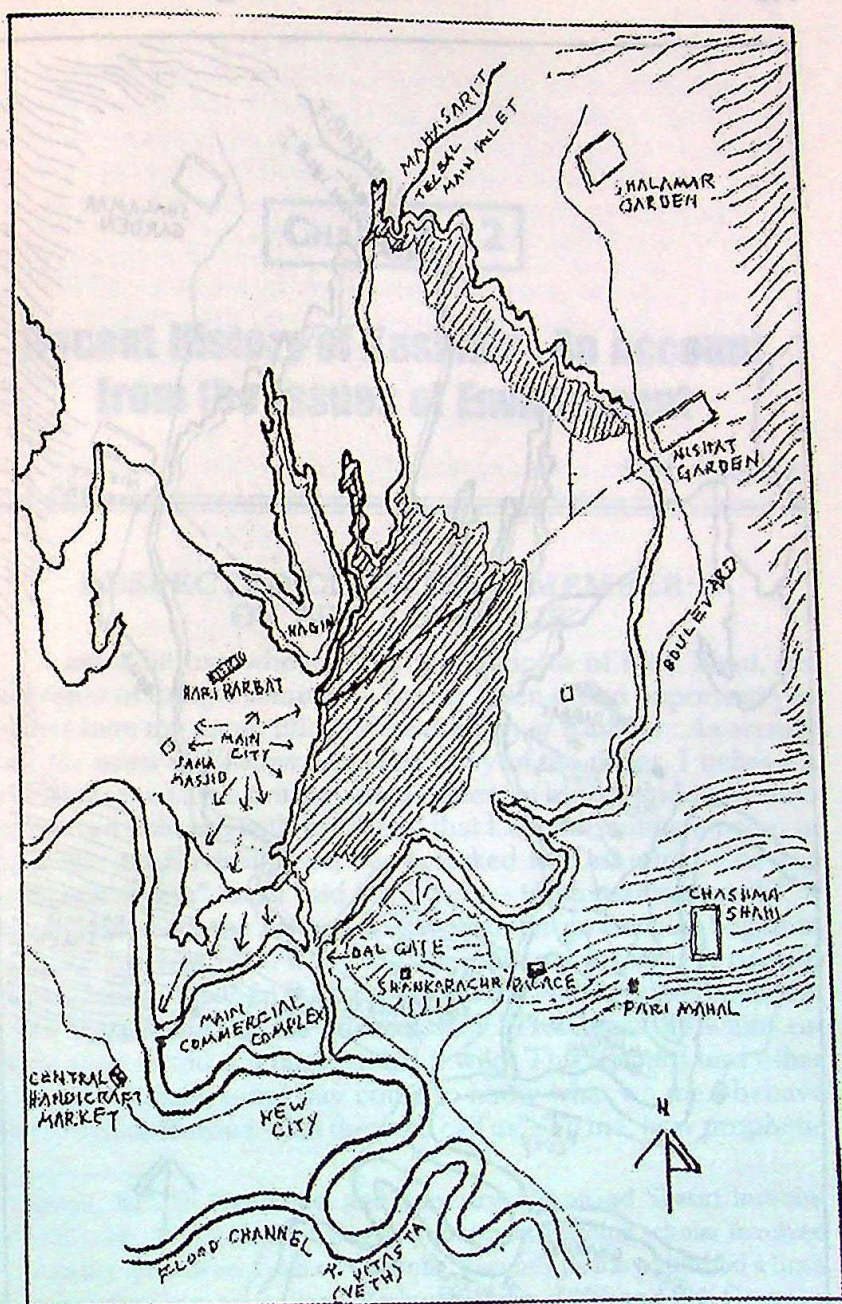


Fig. 11.1 : Population Onslaught on Mountain Slope

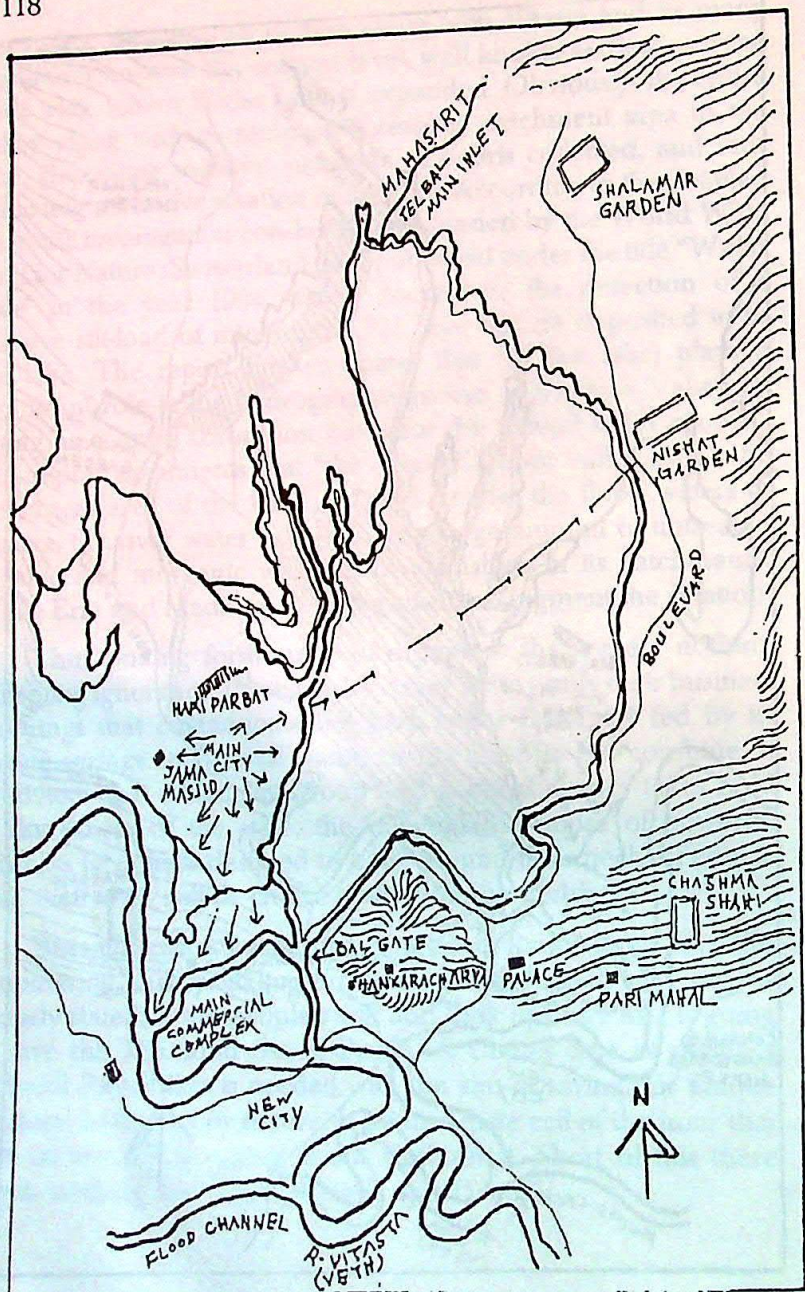


Fig. 11.2 : The Plan of Restoration

CHAPTER 12

Recent History of Kashmir : An Account from the Issues of Environment

S.N. PANDITA*

RESPECTED CHAIRMAN, MEMBER'S OF THE AUDIENCE

I am a bit overwhelmed by the kindness of Prof. Bhatt, the Convener of today's seminar in having given me an opportunity to present here my paper titled : *Recent history of Kashmir : An account from the issues of Environment*. The copy of the paper, I believe is with all of you. I am a primary level student of history and some days back when I shared with my friend that I am presenting a paper in a seminar on Environment, he remarked in Kashmiri, "Che kya waath ath seyeth" and I said "Kehynay— totith makayi waath". If I recall correctly, the history of Environment protection began in India way back in 1951, when the International conference on wild life protection, the then P.M. Pt. Jawaharlal Nehru as the President of the Conference in his address said "This beautiful white cat whom man could not tame called it wild. This leopard and other innocent animals, some day come to know what we men behave like God alone knows what they will call us". To me, how prophetic

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these words are many years later in 1992 when our another P.M. Mr. Narsimha Rao, while addressing the 1st International Environment Conference in Rio-de-Jeneiro, Brazil, said "I started my public life in India four decades back from the state of Andhra Pradesh as Minister for Development and was responsible for laying the roads. Though it led to economic development of the state hardly did I realise then that I was destroying the Environment".

In my view too the problem is not environment but it is the man itself, the only entity in the entire Universe with negative entropy that de-stabilises the natural balance and ecological harmony. Remove man for a while from the context of universe, every thing falls into harmony and stability.

Just a while earlier my friend Dr. Afzal Wani spoke about the problem of faecal odour and stench caused by human waste and its disposal in Kashmir, may I submit that there is no reference in medical and chemical literature to suggest that human faecal odour is an environmental or a health hazard. It causes no human disease. But what has one to say of skin disorders and allergies and respiratory diseases like *Asthma and Bronchitis caused by aerosols, scents and perfumes*. Our opinion sometimes are prejudiced. Perfumes though hazardous are civilised and faecal odour though harmless is hazardous. What is required is the change in our mind set and attitudes. The problem of environmental abuse lies inherently in the urban way of life itself. Just think of it: "A civilised urban person consumes 15 to 20 litres of portable water—I repeat, portable water, to dispose of 100 grams of shit and the man in village, with the help of shovel after defecation produces 100 grams of manure. That is the state of affairs and in my opinion vital to the issues of environment protection. Man alone is the central issue of its abuse and attitudes require to be changed. Let me however turn back to history and environment of Kashmir in recent times.

During the long course of their history Kashmiris have suffered not only at the hands of tyrannous rulers and corrupt officials and religious zealots, but they have off and on been the victims of natural calamities like famines, floods, epidemics, earthquakes and fires. These visitations left deep scars on their lives and their economy. Famines and epidemics spelled death to thousands of people. Whole villages were emptied of their human and cattle population. Earthquakes and fires took a heavy toll of life and property. Cast as they were in such a milieu, the Kashmiris bore these hardships silently and patiently.

In a land so bountifully supplied with water, and where fruits of every kind abound, one can hardly imagine that famines did occur. Yet such has been the case. Kashmir valley has suffered grievously from several devastating famines during the course of its history.

The valley is practically independent of rain. A fairly hard winter stores a sufficient quantity of snow on the mountain tops, and a gradual thaw through the summer keeps the irrigation canals constantly brimming. Thus an abundant harvest is ensured. Hence every famine that occurred in Kashmir was caused, not by summer drought, but by heavy rains in harvest season which destroyed the crops.

To fully gauge the serious nature of these calamities it is essential to know the magnitude and extent of the misery they inflicted on Kashmir from time to time.

There were two famines during the Sikh rule, one when Sher Singh ruled the Valley on behalf of the Sikhs and the other when Kripa Ram was Governor at Srinagar. On both these occasions the grain in the Valley of Kashmir is said to have been destroyed.

In 1877, a like calamity befell Kashmir the outturn of the rice crop was certainly not more than one half of the average. While the maize was first thinned by drought and afterwards drenched by rain and snow. In the territories of Jammu, scarcity was caused by the same circumstances.

The spring harvest of 1877 failed for want of the usual showers. But before all the crop could be cut, or any large portion of it threshed, winter set in with heavy rains and snow which continued almost without intermission till January, 1878. Sufficient sunshine to dry the soaked sheaves never appeared. The rice and maize which had been cut were stacked wet. Combustion set in and the grain became black and rotten.

The excessive rains largely destroyed the produce of the fruit trees also. And when the hungry people had devoured the blossoms of the apples and pears, and the unripe fruit of the mulberries, they turned to the grasses and roots of the swamps and forests. The bark of the elm and the yew was ground into flour. Those near the forests lived on herbs while the skim milk lasted, but herbs without milk soon proved fatal, and before the summer was half over famine was raging in Kashmir.

Then that awful sign of demoralization and helplessness, manifested by the non-burial of corpses appeared, wells and holes were choked with bodies, and prowling dogs began to prey on human carcases. The Gujars of the mountains were the heaviest sufferers, and many orphan girls were sold to the city Hanjis. Many attempted to escape to the Punjab, but at the barriers troops were stationed to prevent the migration of people. Harrowing tales were told of the fathers of families getting past the barrier by bribing the guardians of the passes, while the wives and children were left to die in Kashmir. The accounts of distress in the winter of 1878-79 were very sad. Cold, added to starvation, carried off a large number of people daily. At the end of 1878 the old system, *Rahdari*, under which no man could leave the Valley without permission, was given up and the weak survivors tottered over the passes to the Punjab, many dying on the way.

In the famine of 1877-79 there was an enormous loss of life. One authority has stated that the population of Srinagar was reduced from 1,27,400 to 60,000 and others say that of the total population of the Valley only two-fifths survived. "Years have now passed since the last famine, but the Kashmiri proverb '*Drag tsalih ta dag tsalih na*', which means that the famine goes but its stains remain, is true in all senses.

The mortality was greatest among the villagers. The Maharaja's charity was then turned to the cultivation of turnips on a large scale near Srinagar. Turnip seed was imported from Jammu and the Punjab and the crop was fortunately abundant. Thus many lives were saved.

Maharaja Ranbir Singh did his utmost to save his people, but he never knew the real extent of the disaster until the end of 1878. The Durbar took several relief measures including public works, on which the poor were employed.

The garrison in Kashmir was reduced. Troops were sent to border towns so that grain could be easily procured for them from the Punjab. The passes were opened to all emigrants and the guards who were stationed to stop them were recalled. Ration cards were issued to every family according to its strength. Kashmir thus had the distinction of setting up the first food rationing department in India.

In spite of the purity of its air, in spite of the mountain springs and streams that give it water, cholera and several other preventable diseases worked their wicked will in Kashmir. Not only did the great

towns suffer, but the diseases took their toll from even charming isolated glens, in all parts of the Valley. Notwithstanding the awful state of filth, in which the city of Srinagar had stewed, cholera was not indigenous and its outbreak was generally traced to importation from the Punjab.

Cholera epidemics of Kashmir entitle them to a place in the physical history of Kashmir. As far as can be ascertained the first mention of cholera is in A.D. 1598 and before that time the disease was unknown as "*Wabah*". From 1846 to 1925 there were ten epidemics of cholera, all more or less disastrous to the people of Kashmir.

In 1857-58, cholera raged to December and January and then ceased, but reappeared after three months and prevailed for two months more. In 1897 cholera prevailed for four months and killed thousands of people. In 1872 an epidemic of cholera commenced from August and lasted four months. The epidemic took a severe toll in 1875-76 when it claimed the lives of at least 10,000 people. About the same number of people perished in a very virulent epidemic of cholera within two months in 1880.

Another visitation which commenced in August, 1900 was introduced from the Punjab. Its origin, in the Valley, was traced to the pilgrims for the Amarnath Cave. The disease began amongst this large body, and on their return to their homes, cholera was carried to all quarters of the Valley.

There were 19,265 cases and 10,811 deaths out of which 2,439 cases and 1,293 deaths were at Srinagar, the epidemic lasting 18 months from August 1900 to January, 1902. In 1903-04 an epidemic of plague which prevailed from November, 1903 to July, 1904, killed 1,379 persons in various towns and 56 in Srinagar.

In the year 1906-07 cholera prevailed from November, 1906 to January, 1907, during which 1,626 persons out of 2,629 cases died; 194 deaths occurred in Srinagar. In 1910 cholera prevailed for five and a half months from June, to November during which 18,448 cases occurred and 9,211 lives lost, 2,239 cases and 1,018 deaths occurred in Srinagar.

The above details show that so long as Kashmir enjoyed its isolated position, it was immune from cholera, but as communications with the Punjab increased, the number of invasions of the disease also increased. Cholera, like trade, travelled by roads. Before the road from Baramulla to the Punjab was opened, cholera occurred

in India while Kashmir was healthy. But after 1880 when the Jehlum Valley Road was thrown open to traffic, cholera found its way along the crowded road and the narrow valley to Srinagar.

Dr. A. Neve in his "Kashmir Mission Report for 1888" wrote: "The wonder is not that cholera came, but that it ever went away: not that it slew 10,000 victims, but that so many escaped its ravages." And according to Dr. R. Harvey deputed by the Government of India to investigate the cholera epidemic of 1892, "It is not too much to say that the inhabitants eat filth, drink filth, breathe filth, wear it, sleep on it, bathe in it, and are steeped in and surrounded by it on every side: and till this state of things is altered, it is as certain as fate that epidemics of cholera at shorter and shorter intervals must continue to recur".

After the cholera epidemic of 1892, the State authorities came to the conclusion that the remedy against cholera and other diseases lay in improvement in the sanitation of the city and the major towns of Kashmir. Small-pox appeared in epidemic form almost every year. However vaccination against this dreaded disease was begun from 1892, and this had a salutary effect. By 1918 small-pox claimed a negligible number of lives. But as the century advanced, deaths from tuberculosis increased year by year at an alarming rate. In 1918, for instance, there were as many as 608 deaths in Srinagar alone. This was the direct result of the filthy, ill-lit, ill-ventilated dwellings and their over crowding. Similarly the enteric fever, exacted a heavy toll and was foremost in the list of causes of death every year.

Twenty thousand people perished in the two cholera epidemics of 1888 to 1892 while in the last two cholera epidemics of 1914 and 1915 only one thousand and seventy-eight lives were lost. Another great triumph was over small-pox. It was now a rare occurrence, while formerly this disease wrought great havoc and caused terrible infantile mortality, so much so that a mother while being congratulated on being blessed with a baby would, with the shadow of a great fear in her heart reply, *avah yelih shital bud traves*, that is, the congratulations should come after the child survived small-pox.

The formation of the Kashmir valley makes it liable to floods. The most devastating flood that Kashmir has seen since 1841, visited the Valley in full force in July, 1893. The warm rain denuded the mountain peaks of snow. The Jehlum became so swollen, that miles of land on both banks were flooded. All the embankments were breached.

The European quarter called Kothibagh and Munshibagh were under 10 feet of water. The golf ground was under an equal depth of water. The Jehlum cut the bund at Dal Darwaza and inundated Rainawari, the most populous part of the city.

As the floods rushed through Srinagar, the city and its seven bridges held up the water and converted the valley both above and below Srinagar into a vast lake. The Habba Kadal bridge, which was burnt in the great fire of 1892 and had lately been reconstructed gave way, and carried away with its wreckage other 5 bridges of the city and many boats. The only bridge remaining intact was the 1st bridge or Amira Kadal. Many substantial buildings came down and many families had narrow escapes. The Post and Telegraph offices were closed, having been inundated. The State Hospital was severely damaged and a part of its buildings collapsed. The patients were removed to the Shergarhi Gate. The whole population above the Amira Kadal took refuge in boats, and people who could not be thus accommodated took shelter on the roofs of tottering houses. The cantonment was completely flooded.

The most serious loss to the State was in bridges. With the exception of bridges at Amira Kadal, Sumbal, Sopore, and Baramula, all were swept away. The first city bridge, though it stood the shock of the flood, was under water, and impassable. The flood of 1893 was a great calamity.

History alas, repeated itself within so short a period as ten years. The Resident in Kashmir in July, 1903, reported to the Viceroy that heavy floods in the Jehlum equal to that of 1893 were approaching the city.

On July 23, the greatest flood ever known came down the valley of Kashmir on Srinagar, and that day the whole of the ground covered by the European settlement, as well as the flanks of the city, was converted into a huge lake. Measurement showed that the water level was higher by three feet than the flood of 1893. The bund protecting the Dal Lake was also breached near the flood gates, the water rising to ten feet above the high level, and inflicting immense injury to floating gardens and houses. Seven thousand dwellings went down in the neighbourhood of the city, including 773 on the Dal Lake. Compared with 1893, the damage to bridges was small. Only those at Khanabal and Baramula were swept away. In the Munshi Bagh, the old library, the barracks, two of the older houses, and two in the Hari Singh Bagh were destroyed. The Residency, Nedou's Hotel, all houses and offices had upwards of five feet of

water in their ground floors, and people stepped out of the Hotel varandah into boats. The church, with a very low plinth, suffered much, the water covering the lamp chandeliers, and only the roof being visible from the outside.

The expansion of Srinagar had started with the beginning of the last century in a haphazard way. The low-lying land towards the south had developed into Civil Lines where there were European shops and hutments. The flood of 1903 swept away this locality and the Resident, Sir Luis Dane, decided to undertake flood protection measures on a long term basis. The State Engineer, Mr. Field, in collaboration with the Electrical engineer, Major A. de Lotbiniere were detailed to prepare a comprehensive scheme in this respect.

In 1905-06 the machinery required for the hydro-electric generating plant at Mahora and the dredgers for deepening of the bed of the river at Baramula were ordered from America. The Mahora power house was complete by the end of 1907. Incidentally it may be mentioned here that it was the second hydro-electric project then in India the first one being in Mysore. Dredging operations began in 1908 and by 1912 an area of 6,100 acres was reclaimed from around the Wular lake.

Fortunately for the Valley there were no major floods for a quarter of a century. The dredging operations though valuable in their own way, were looked down upon by the State as useless expenditure and in 1917 the dredgers were sold a junk. The result was that the old story of silting up of the river bed in the Wular lake was repeated and when in 1928 there was a flood towards the end of August, the low lying parts of the city of Srinagar which had by then extended to a larger area were inundated and destruction was caused to the standing crops. Again the State government woke up to taking flood protection measures, but instead of having a long term view of the problem, they started again to build high bunds round the low lying parts of Srinagar - the chief aim being to save the city at the cost of the rest of the valley.

No less calamitous than famine and floods for the people of the Valley has been the occurrence of earthquakes. A remarkable manifestation of igneous presence was noticed in 1875 at Soiyam, a village in Machipura. when the soil there became so heated that rice could be cooked thereon. The phenomenon lasted for thirteen months and the Hindus flocked to the place to offer oblations to the souls of their departed relations with the rice cooked in this fashion.

Since the fifteenth century eleven severe earthquakes were recorded, all of long duration and accompanied by great loss of life. In the nineteenth century there occurred four severe earthquakes. Vigne, writing in 1835, says: 'In Kashmir, before 1828, there had been no great earthquake in the memory of any living person, excepting of one about 1780, which lasted at intervals for a week. Severe or mild shocks were common, and the houses were built with a wooden framework, so as to resist them.'

The earthquake of 1828 occurred in June which shook down some 1,200 houses: and perhaps 1,000 persons were killed.

The terrible earthquake of 1885 occurred commenced in the Valley in May and shocks continued upto August. The dreadful visitation in Kashmir in 1885, caused much loss of life and property. It is thought that over 20,000 houses, 30,000 cattle and 3,000 human beings were destroyed. The air stank with rotten carcasses.

Along the Valley, whole villages were overthrown, and their inhabitants crushed, specially at and around Magam, at Baramula, the fort, dak bungalow and three fourths of the houses were wrecked. The fort on the right bank of the Jhelum, below the Naoshera was destroyed, and the houses at Uri much injured. The massive temples at Patan, and Martand were also much shaken. At Srinagar the barracks fell, killing nearly 60 soldiers. In the Munshi Bagh, the British Residency, a single storied building, was rendered so unsafe that it had to be pulled down, and the present double storied house was in consequence planned and erected by Sir Oliver St. John. Many other houses were dangerously cracked, some of which survived a few years. Lawrence adds: "Large fissures were formed, from which water and fine sand, smelling strongly of sulphur, were thrown out. Many irrigation springs disappeared, and a large landslip occurred to the south of Baramula. This landslip which took place on the sloping ground above Larridura. about 1,500 feet above the level of the Wular lake, has left behind it a hardened clay, in which were found many specimens of the Singhara nut."

Earthquakes and floods have rendered it necessary to use timber largely in the construction of houses in Kashmir, but cold drives the people to make free use of the kangri with live charcoals, and these have combined to make the houses peculiarly liable to fire.

Hence fires were of frequent occurrence in the city as well as in the villages. At different times from 1875 to the end of the century at least half the city was destroyed by fire.

In 1878, 1,000 houses from Haba Kadal to Sadi Qazizad in Srinagar were reduced to ashes. Another visitation was in 1892 when fire occurred at Haba Kadal which extended down to Fateh Kadal and crossing the river to Tashwan, destroyed 1,343 houses, rendering 7,552 persons homeless. A severe blow was dealt in 1899 to the trade and commerce of Kashmir when Ranbirganj Bazaar, the center of trade in Srinagar, was destroyed by fire resulting in immense loss of property.

The problem of the prevention of fires in Kashmir which recurred almost annually during the dry months of autumn and cold seasons when all the Kashmiris use Kangris full of hot coals to keep themselves warm, engaged the attention of the State Government in 1893. All the serious fires always originated in thatched houses, where a slight spark quickly set the whole roof ablaze, and made it impossible to extinguish the fire before the nearby houses caught fire too. During the progress of one fire, sparks rising in the air fell on thatched roofs in other parts of the city and produced fresh conflagrations. One measure which was thought to bring again into force the old rule passed by Maharaja Ranbir Singh, making it compulsory for owners of houses to keep a certain number of earthen pots full of water on the roof of each house for the purpose of extinguishing a fire. Sometimes for want of a few gallons of water, a fire could not be dealt with at the commencement: and it quickly assumed destructive magnitudes.

At the suggestion of Surgeon Colonel, R. Harvey, and Dr. A. Neve, it was proposed to remodel the part of the city of Srinagar where the devastating fire of 1892 occurred. Straight, broad roads and alleys were opened, and it was made compulsory to build only pucca houses on the roads and banks of the river. This latter rule was recommended with a view to improving the beauty of the city. As a precaution against fire, thatching of roofs was banned. There building of the burnt houses was stopped pending the decision of the council in the matter. Dr. Harvey also discussed with the Resident some important municipal improvements that were necessary for preventing the recurrence of cholera and other epidemics.

A fire brigade was organized and equipped with water pumps worked by steam. The brigade was put under the control of the Superintendent of Police. Its efficiency was tested when in November of 1893, it effectively put out fire in Srinagar during the dead of night.

(Summary extracted from Socio-Economic History of Kashmir)

CHAPTER 13

Environment in Bhumi-Sukhta of Atharva Veda

TRILOKI NATH DHAR 'KUNDAN'

In his inaugural address at the Seminar on Environmental Management Education held in April, 1978 at New Delhi, Mr. Henry Kaufman, Deputy Resident Representative, UNDP made these observations: 'The world was perhaps a much happier one long ago. In your country the Rishis and sages chose areas near rivers to set up their ashrams, which became centers of learning. They gave to posterity the Vedas and scriptures. The Rig Veda is replete with worship of nature. The Sun, the Moon and the fire have been venerated for ages in India. In the name of Shastras, many home truths were inculcated in the young ones. The injunction that one should not answer calls of nature near rivers and fresh water ponds in the name of Shastras was nothing but an expression of a desire to preserve purity of the environment. I am told that in the not too distant a past the elders of villages used to take an interest in planting flower gardens immediately near river banks as a measure of protection of the rivers. Small ponds, which got water by seepage, were the washing places and not the rivers. I say these to impress upon you that environment consciousness has been an integral part of Indian life'.

It is indeed so. After all what is environment? It has been defined as the totality of man's surroundings and our sages and

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seers were very much alive to the surroundings and the need to relate to it physically, mentally and spiritually. Caves, shady trees and hermitages in forests were often chosen as the places for penance, contemplation and meditation. Before we proceed further let us observe a vital fact of the ancient wisdom. Here in our country knowledge has never been compartmentalized and divided into various subjects. There has always been a holistic approach to learning. A person had to start from the rudiments of Language and Grammar, wade through various texts on Logic, Exegesis, Astronomy, Geography, Chemistry, Physics, Psychology and other disciplines before studying Philosophy and other topics of spiritual purport. The aim of studies was all round development of a student. It is, therefore, very difficult to find an ancient treatise or a text exclusively dealing with a subject like Environment or Ecology. Even so we find passages after passages in our corpus of ancient literature, which show amply how much alive ancient Indians were to the need for preservation and purity of environment. A glaring example of their concern is the practice of 'Yajna', the holy fire wherein choicest herbs and other items are burnt for the purification of the air and the surroundings. In this chapter I shall confine myself to one 'Sukhta' in the Atharva Veda, the 'Bhumi or Prithvi Sukhta', which is in the nature of a hymn to the mother Earth. It is the first Sukhta of 12th Canto of the Atharva Veda consisting of 63 Mantras.

About the Vedas it has been said, '*Sarvam Vedat prasidhyate*' meaning that information on all topics can be had from the Vedas. Rishi Atharvan has done a great service to the humanity in compiling Atharva Veda, the treasure house of knowledge. This compilation of the Vedas is different from the other three compilations of Rig, Yajus and Sama in as much as while those three discuss and dwell on the rituals and the spiritual aspects of the human existence, this Veda caters to the mundane aspects of our life. Health, longevity, governance, diseases and their treatment, social interaction and other such topics are covered in this compilation. It is in this compilation that we find a beautiful, meaningful and purposeful hymn to the mother earth. The earth has been addressed as the mother, the clouds as the father and men as their children. The oft-quoted lines from this Sukhta are, '*Mata bhumi putro'ham prithivyah* - the earth is my mother and I am her son'.

The creation of earth has been explained in the Shatpath Brahman thus: '*Iyam vai prithvi bhutasya prathamaja* - '*Bhur-iti vyaharat sa bhumim-asrijat*'. Brahma, the creator created this earth

merely by uttering the word Bhu as the first product of various elements called 'Bhuta'. The Vedic Rishi has stated that the earth came into existence in its present form after going through nine different stages, which are termed as '*Phena, mrit, shushkap, usha. sikhta, sharkara, ashma, ayah and hiranya.*' They have also acknowledged the existence of fire or energy in the heart of the Earth by saying, '*Agnigarbha prithvi*'. The North Pole has been given the name of 'Daiva disha' or the holy direction and it has been clearly mentioned that the earth is tilted towards this side. The South Pole has been called 'Asurdisha' or unholy direction and the abundance of water on this side has also been mentioned. Similarly in the Rig Veda three goddesses have been conceived, Ila, Saraswati and Mahi, representing respectively food-grains, knowledge and earth. This thought of giving prominence to mother earth has been reiterated in the Bhumi Sukhta in these words: '*Bhume matarni-dhehi ma bhadraya supratishthitam* - O Mother Earth! Dispose my lot in gracious fashion that I be at ease and in harmony with all the powers of heaven'. The Prithvi Sukhta says that all the cities situated on this earth are established by gods, 'Devatas'. The rivers, the mountain ranges, the caves and other aspects of nature are the abodes of these gods and made celestial by their presence. This metaphor seems to have been employed to bring home to us the importance of nature in our lives, '*yasyah puro devakritah kshetre yasya vikurvate, prajapatih prithvim vishvagarbham-ashamasham ranyam nah krinotu* - let the Creator make this mother earth of ours beautiful on all sides, whose cities have been established by the gods'.

The existence of forest wealth, cultivable land and animal life has been explained at different places of this sukhta with its importance for the mankind. '*Kshetre yasya vikurvate*—in the fields of which tillers toil hard', '*yasyam-annam vrihiyavau*—where different crops of wheat, barley and other foods are grown', '*nanaveerya oshadhirya vibharti*—wherein different kinds of medicinal herbs are grown', '*yasyam vriksha vanaspatya dhruvastishthanti*—where trees and plants are firmly planted' and '*gavam-ashvanam vaysascha vishtha*—which is the abode of cows, horses and other animals' are some of the illustrations of this awareness.

Thus it may be seen that whereas the problem of ecology, environment and pollution has gained importance in the modern world in the recent past only, the Vedic Rishis were all along conscious of this important aspect. In their own way, using religious metaphors and symbols they guided humanity to enjoy the nature

with due care. They ensured that the natural resources that got depleted by our constant use were made good simultaneously. Today we see that the situation is turning grave because of the indiscriminate use of the forest wealth, soil erosion, silting of lakes and rivers as also industrial waste and emission from various types of energy sources. Rapid industrialization, expansion of urban boundaries, multiple crop harvesting and unchecked noise pollution add to the seriousness of the problem and make it more intricate. One cannot forget the gravest tragedy of Bhopal disaster that has caused more damage to human life than any war, earthquake, famine or cyclone has done.

The remedy for this problem of pollution, ozone layer, wild life, flora and fauna is not far to seek. All that we have to do is to replenish what we use, protect the species in animal and plant world from getting extinct, find alternative sources of energy with no polluting effect and ensure a balance in natural resources. We should not and must not sacrifice our tomorrow for the sake of the comforts of today or else our forthcoming generations will not forgive us for the suffering they will have to undergo. Scriptures say, '*Dharmo rakhshati rakhshitah* - righteousness protects when protected'. On the hills of Tirupati they have very aptly written a changed version of this saying in bold letters thus, '*Vrikshorakhshati rakhshitah* - the protected trees protect us'. This is true of anything in nature. If we take care of the nature, the nature will take care of us and make our lives comfortable and worth living.

As has been stated earlier even though the 'Bhumi sukhta' is in the nature of a prayer unto the mother earth, there are a lot many mantras relating to the environment and the related problem. In my view mantra no. 35 is very important. It goes thus: *Yat te bhume vikhanami kshipram tadapi rohatu, ma te marma vimrigvari ma te hridayam-arpipam* - 'Whatever I dig of you, O Earth! May you of that have quick replenishment; O purifying one! May my thrust never reach right into your vital points, your heart'. This mantra clearly shows that the Rishis of yore were well informed about the fact that agricultural activities cause depletion in the productivity and fertility of the earth. They also knew that this depletion needed to be made good simultaneously or else it would harm our interests in the long run. For this reason only the word used is '*Kshipram*' meaning quickly without any delay. The same idea is conveyed again in mantra 61 which reads, '*Tvamasyavapani jananam-aditih kamadudha paprathana, yatta oonam tatta aapooryati prajapatih prathamaja ritasya* - Primeval Mother, disperser of men, you, far-

flung Earth, fulfil all our desires. Whatever you lack, may *Prajapati*, the First-born of *Rita*, supply to you fully'.

Our ancestors gave a lot of importance to the relationship between man and the nature. Rigveda is full of '*richas*' relating to earth, water, energy, air and sky. It has been emphasized therein that the existence on this earth of humans, animals and plants gets support and strength from these five elements. The scriptures have therefore, underscored proper and judicious utilization of these resources. Both the Manu-smṛiti and the Yajñavalkya-smṛiti lay stress on our responsibility towards the protection and development of the animal and plant life. A study of 'Prithvi-sukhta' brings forth the utility of the earth in as much as it is from earth only that we get pure water, healthy food and a variety of scents. *Yaste gandhah pushkaram-avivesha* —give us the fragrance of the scent which lies in the heart of the lotus flowers'. It is earth only that helps the growth of the cattle and horses and thus is a source of milk and milk-products. In mantra 17 the earth has been addressed as the mother of life-saving drugs, '*vishvasvam mataramoshadhinam dhrwam bhumim prithevim dharmana dhritam shivam syonamanu charema vishvaha* - Mother of life-saving herbs, begetter of all things, firm and sustained by Heavenly law, kind and pleasant is she. May we ever dwell on her bosom and move about'. The same idea is repeated in Mantra 57, which calls earth as '*Bhuvanasya gopa vanaspatinam gribhīr-oshadhinam* - a repository of plants and medicinal herbs.

At every step in this Sukhta it has been begged of the earth to give us milk, strength, scents and the very life. Sukhta No. 23 reads '*Yaste gandhah prithevi sambabhuva yam bibhratyoshadhayo yamapah yam gandharva apsarasashcha bhejire tena ma surabhim kṛinu ma no dvikṣhata kashchana* - O Earth! You produce scents which go into drugs and water and are enjoyed by *gandharvas* and *apsaras*; pray let me enjoy that scent and let no one hate me'.

In 12th Mantra the structure and the properties of the earth have been suggested and the existence of energy therein has been stated. The importance of rain for the earth's fertility and in turn for the welfare of human beings has been implied by indicating an intimate relationship between them. '*Yatte madhyamprithevi yachcha nabhyam, yastu urjastanvāh sambabhuvuh tasu no dhehmabhi nah pavasva, mata bhumih putro aham prithivīyah, parjanyaḥ pita sa u nah pīpartu*—Impart to us those vitalizing forces that come O Earth from deep within your body, your central point, your navel, purify us wholly. The Earth is mother and I her son, the rain-giver is my

father. May he shower blessings on us'. Earlier in 9 mantra it has been begged of Earth that she continues to give us uninterrupted supply of milk and water from the ever-flowing rivers on her surface, '*yasyamaapah paricharah samanir-ahoratre apramadam ksharanti sa no bhumir-bhuridhara payo duhamatho ukshatu varchasa*—On whom the following waters, ever the same, course without cease or failure night and day, may she yield milk, this Earth of many streams, and shed on us her splendour copiously.

Large-scale deforestation resulting in climatic changes, soil erosion and other hazards has brought home the importance of afforestation not only on hills and mountains but in the planes as well. Our rishis were so farsighted that they had time and again emphasized the utility of not only trees but also of rivers, herbs and other items of nature for all living beings. The mantra no. 22 is important for underscoring the role played by the earth in ensuring our longevity. It says, '*bhumyam devebhyo dadatiyajnam havyam-arankritam bhumyam manushya jeevanti svadhaya-annena martyah, sa no bhumih pranam-ayurdadhatu jaradashtim ma prithevi krinotu*—On this earth we offer oblations through the holy fire to gods. On this earth we live by these oblations and food. May this earth give us life and longevity! May this earth secure us a complete life! There cannot be a better and more pointed reference to the ecology than the opening four mantras of the Bhumi Sukhta. These mantras narrate the grandeur of the earth and the richness of the nature. They have been rendered beautifully in these stanzas:

- *High Truth, unyielding order, consecration,
Ardour and prayer and holy ritual
Uphold the earth, may she the ruling Mistress
Of what has been and what will come to be,
For us spread wide a limitless domain.*
- *Untrammelled in the midst of men, the Earth,
Adorned with heights and gentle slopes and planes,
Bears plants and herbs of various healing powers.
May she spread wide for us, afford us joy.*
- *On whom are ocean, river and all waters,
On whom have sprung up food and plowman's crops,
On whom moves all that breathes and stirs abroad—
Earth, may she grant to us the long first draught!*
- *To earth belong the four directions of space.
On her grows food; on her the plowman toils.
She carries likewise all that breathes and stirs.
Earth, may she grant us cattle and food in plenty!*

CHAPTER 14

A Study of Environment of Wullar Lake, Kashmir

NAHIDA ASSAD BASU*

INTRODUCTION

General Introduction

The vale of Kashmir - bestowed with number of beautiful lakes, lush green meadows, dense forests, rich health resorts and refreshing streams, is an unparalleled piece of land on this earth.

It has, since ages been tantalising the lovers of nature and tourists from far and wide. The unique advantage to the tourists offered by the valley of Kashmir, is that they get beauty in diversity plus all the comforts of the plains in the length and breadth of this wide hill station.

Tourism is a major industry of the state of Jammu and Kashmir and economy of valley is heavily dependent on handicraft industries and retail and tourist services.

But decline in tourist number and their length of stay in Kashmir have considerably effected the prosperity of the state, from last 12 years.

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WULLAR LAKE

A vast expanse of water known as Wullar lake, situated to the North-West of historic city of Srinagar within the longitude 34°C-15°N and 34°-25°N (i.e. 1127 km to 1147 km. North of Equator) and latitude 74°-30°E to 74°-40°E (i.e. 3341 km to 3357 km East of Greenwich).

Wullar lake is the biggest sweet water lake of Asia.

It is surrounded by the villages Ashtung, Mangnipora, Pathushai, Watapora, Qazipora and Kalusa on North.

Sadunara, Madwon, Khusarpora, Shahgund, Haritar and Tarzu on South.

Sopore town, Janwara, Watlab, Kinhus and Kanibuth on West.

Its luxtrous water, surrounded by back drop of beautiful refreshing streams, hills and orchards, when seen from commanding viewpoints mesmerise the nature lovers.

Dr. Iqbal in this poem has given his impression about Wullar lake as under :-

ہمالیہ کے چشمے اُلتے ہیں جب تک

خضر سوچتا ہے در کے کنارے

*Himala Ke Chesma Aubalta Haa Jub Tak
Khezor Sochta Ha Wulor Ke Kinare*

ہم لیا کھ چشمہ آبولا تو ہا جب تک
خضر سونچتا ہا بولار کو کنارے

One of the local intellectuals Mr. Ali Mohd. Bulba has drawn a vivid picture of the lake in the following verses :-

تراگہ بل کی رفعتوں سے دیکھئے در کی جھیل

بانڈی پورہ مصر ہے گویا کنارے نیل

*Tragbal Ke Rifatoo Sa Dekha Wular Ke Geel
Bandipora Mesar Ha Goo Ya Kenaraa Neel*

تراگہ بل کی رفعتوں سے دیکھیے ولر کی جیل
بانڈیپورہ میسر ہے گویا کنارے نیل

While going around the lake one finds numerous places to watch and get absorbed in scenic and enchanting beauty of the lake full of Fauna and Flora.

HISTORY OF WULLAR LAKE

The age of lake is not known. It is generally believed that it was once capital of Kashmir named Sind-Mantnager but subsequently due to violent earthquake, land sank and river Vitasta got diverted and formed the lake.

The per chronical Nilmata and other texts the ancient name of the lake is "Mahapadmasaras", derived from Nag Padma. The name "Volla" from which the present name Volar (Vulgo Wodar) seems to have been derived, is found in Janarjas chronical and can be interpreted as turbulent or the lake with high going waves and the sensation of crossing the lake during strong winds makes one readily agree to the appropriateness of the designation.

According to Tarikhi-Hassan during ancient time water from Lar Pargana was flowing into Krishen-Ganga. Once a huge snow avalanche fell from Weghi mountain, blocked the passage of water and created a big reservoir of water. It was called Satisar. It is said that during that period people were coming for boat drive in the lake and on the right hill boat tie hooks are still existing. Due to earthquake during a dark night a hole developed in the city of Sind-Matanagar, the water of Satisar gushed out through it, the city vanished giving way to Wullar lake.

PURPOSE OF THE STUDY

The purpose of this study is to report on the present conditions of Wullar lake and to recommend ways of improving the quality of water and the lake environment.

The lakes in the Kashmir valley are important both from the point of view of ecology as well as for tourism.

Over the years, some of the lakes such as Wullar lake have been encroached upon and have become polluted. Due to our own negligence, Wullar lake is shrinking in size. Increase in agricultural activity and the reduction of plant-cover on the hill sides surrounding the lake with the consequential increase in

surface erosion and leaching of soil nutrients have added increasing quantities of nutrient-rich run off.

The lake weed interrupts to the flow of lake water and reduction in the volume and surface area of the lake have reduced the capacity of the lake to respond to the stresses placed on it. Poor water quality and pockets of stagnant water are all too apparent. The health and very life of the lake is threatened.

In the past, Wullar lake has played a major role in the Kashmiri way of life. In future, Wullar lake could play an increasingly major role in the development of the Kashmiri economy but the pollution must be controlled and this is the purpose of the study.

PROBLEM

Since ages Wullar lake has not only shrunk in size but also in depth giving a serious set back to navigational and recreational utility of the lake. The purity of the water is also deteriorating with the passage of time. Consequently several products from it such as Fish. Trapa (Singada), Nalamboe (Nadroo), Khai-Kharoo, Games etc. are diminishing proportionately.

The various facets of the problem with contributing reasons are elucidated below :—

Size

With the increase in population, the thrust on land for cultivation purpose is ever on increase. To bring more and more area under cultivation for production of foodgrains, the inhabitants of the peripheral area are encroaching upon the lake fringes. They have been building on various contours for protection of their crops against floods. The Government have also willingly or unwillingly contributed towards the encroachment of the lake land by construction of flood embankments and lift stations for irrigation, as also by large scale plantation.

Deforestation of Catchment Area

The whole catchment of Kashmir valley up to Sopor a drains ultimately into the Wullar lake before its passage through Khadanyar gorge to the plains of Punjab. Denudation of hills/mountains due

to whole sale deforestation has increased the silt flow into the lake through various tributaries. This has not only reduced the size and depth of the lake but has also eased encroachments for bringing more and more area around its periphery under cultivation.

Afforestation

With the increasing demand for fire wood, the Forest and Rakhs and Farms Departments have brought more and more lake area under afforestation. Such plantation while deadening the flow causes the lake water to shed its sediment load within the lake which otherwise would have been washed off through the outflow channel. The general tendency of the Rakhs and Farms Department as also the Forest Department not to root out but only sawing the trees trunks near the ground level, leaving the root part of the trees intact, helps in the deposition of major part of the silt and viscous matter in the lake body.

Water Quality

Once claimed as the purest natural largest water body in Asia; the lake is subjected to continued deterioration due to nutrients and pollutants from its catchments. The population settled in the basin and the area around discharges human excreta and other wastes into the lake.

Additionally in areas where lands have been irrigated around the lake and in recent years orchards developed chemical fertilizers and germicides, which gets washed off into the lakes. Since the quantity of the water in the lake is dwindling fast in proportions to its size and depth. The concentration of the impurity increase chemically, this has naturally affected in turn the biological life in the lake.

SUMMARY

In view of deterioration in the quality of the water and reduction in size due to encroachments on the lake body, the Government feels deeply concerned and has decided to get the boundaries of the lake identified and proposals formulated for its protection or preservation. It was therefore in pursuance of the Government decision communicated vide Government Order

No. 151 of 1982 dt. 31-03-1982 that Reconnaissance survey of the lake was undertaken and the data available with different agencies collected and analysed for formulation of this feasibility report.

PHYSIOGRAPHY

Physical Features Around Wullar Lake

The North-Eastern part alongwith the whole Northern sector of the lake is towered by high mountainous ranges, which drain off their run off into the lake through various flashy nallahas, prominent of them being the Erin and Madhumati. The foothills of these mountains have partly been irrigated almost to the water edge in these sectors.

The Eastern and Southern sectors are the low lying plain areas of the "SONAWARI" which used to get the inundated almost during every flood. However, a series of parallel protection and land reclamation bunds along the periphery and along the river and Nallah bank in a criss-cross manner have been raised after careful study of the floods, whereby the whole area has been assured of flood safety. The land thus reclaimed and protected have in the recent past been partly irrigated (with lift irrigation system) partly cultivated with dry crops/pulses (where such crops could be raised) and vast area could be brought under orchards willow or poplar plantation.

The Western section i.e. Sopore— Watlab section enjoys assured irrigation through "Zaingir" canal and is therefore chiefly under paddy crops. Some of the low lying land along lake fringes actually forming a part of the flood absorption basin has been unduly protected by a series of parallel bunds as well as other criss-cross bunds as a safeguard against floods.

Main source of water to Wullar lake is from River Jehlum, which enters the lake in Banayaree.

Source of river Jehlum is the spring at Vare Nag. It has various contributories from Vare Nag to Banayaree, namely Ladernala, Bringenal, Vasnonala, Sind nala, etc. upto Banayaree besides other small contributories.

Below Banayaree the lake gets augmented by Erin Nallah, Madhumati Nala on right side and Ninglinala and Sokhna Nalla at left side.

DRAINAGE CONTRIBUTION TO WULLAR

The following streams contribute their might to the Wullar lake :-

(1) River Jhelum (Veth)	It's gauge, discharge, silt etc. recorded at Ashar;
(2) Erin-Nallah	It's gauge and discharge being recorded at Pacchin.
(3) Madhumati	It's gauge and discharge being observed at Sonawari
(4) Ferozepora/Sukhnagh Nallah	It's gauge and discharge being recorded at Naid Khai.
(5) Ningli Nallah	It's gauge and discharge being recorded at Naid Khai.
(6) Ashtengo Nallah	(No records available)
(7) Botengo Nallah	-do-
(8) Kinhim Nallah	-do-
(9) Potushai Nallah (Tati Khul)	-do-
(10) Gadh Khul Nallah	-do-
(11) Argam (Gurur) Nallah	-do-
(12) Wyijhur Nallah	-do-
(13) Ajas Nallah	-do-
(14) Haritar Nallah	-do-

The only outflow from the lake is the Jehlum River flowing through Sopore to Baramulla. The quage and discharge are recorded at Sopore and as well as at Baramulla.

It is presumed that there are some springs in the lake itself.

AREA OF LAKE

Past

There is no record of the lake area as it stood during its initial stage. From a glance at the topography of the area, it is evident that the land on the left bank of the River Jehlum below Markundal Sumbal has been created by the continued silt deposition of the River, in the Kalhan's "*Rajtarangini*" the dimensions of the lake during normal year has been recorded as 12 miles \times 6 miles i.e. 72 sq. miles or 189 sq. kms and during the floods 13 miles \times 3 miles i.e. 104 sq. miles or 273 sq. kms.

Nassan Khuihami in his "*Tarik-i-Hassan*" has given the dimensions of the lake as 12 miles \times 8 miles i.e. 96 sq. miles or 252 sq. kms.

Present

The lake and its peripheral area has been surveyed by the Survey of India (Govt. of India) and map has also been published by them.

It has contour interval of 1 meter but lacks contours for main water body area. The lake water fringes between the contour intervals of 1576 meter and 1577 meter, which have been presumed as the average winter water level of the lake. Area bounded within this average water level i.e. between RL 1576 meter and 1577 meter contours is 58.70 sq. kms only. This of course relates to winter and cannot be taken as the lake area being much more than this figure as is also evident from the high flood conditions given below.

Taking the highest flood level as 1579.00 mts. (5180.466 ft.) contour was drawn around the lake except on the southern side marked by a permanent flood protection bund known as 3rd line of embankment (popularly known as 3rd line of defence). The area of the lake within the above mentioned line was computed and works out to 173.15 sq. kms.

In order to reassess the lake area, its boundaries were got demarcated by the Revenue officials on the basis of revenue records. Area bound by the line of demarcation as physically delineated at site and transferred on the plan works to 130.25 sq. kms. Out of 130.25 sq. kms. 3.70 sq. kms are under paddy and other dry crop cultivation, 0.15 sq. kms under habitation and 60.50 sq. kms under plantation. Even these figures cannot be considered authentic in so far as the actual government owned lake is concerned, which might be much more in view of the flood absorption area at the high flood level of 5180 ft. (1579 metres) having been adopted by the Flood Control Department after detailed hydrological studies and that too after conceding some areas such as the one beyond 3rd line of embankment etc.

ECONOMIC ASPECT OF LAKE**Produce of the Lake**

The lake is a source of livelihood to thousands of people residing on or around the lake body and also to the persons connected with the trade of its produce. It has far reaching

implications on the socio-economic life of the community dependent on it.

A lot of direct and indirect revenue in addition to employment is generated by this lake. The most important products from the lake are as under:

Fish

The various varieties of the fish thrive within the lake. More than 8,000 souls are earning their livelihood on the fish game. Additionally hundreds of persons are engaged by co-operative societies and persons dealing in fish trade earn their livelihood on this game.

Trapa

Trapa commonly known as Singada is available in three varieties as Sabaz, Dry and Abi. The actual production depends upon the stability of water levels in the lake.

More than 3,000 families are dependent on Trapa production. Additionally various other trade agencies are directly and indirectly engaged on this produce, besides thousands of men and women living in the surrounding villages of the lake collect Trapa for their daily use during the harvest period.

Trapa is directly sold by the concerned in the market, it can be taken just after boiling it in small quantity of water or we can take it by frying in oil or by roasting it.

Trapa is also dried. This dried Trapa has a good medicinal value. This dried Trapa can be used directly or its flour is made and is used in cooking which is said to be useful for diabetic patients.

Nalamboc

More than 500 families are reported to be engaged on extraction of this produce besides others engaged in its trade.

Nalamboc has a good market in Kashmir. Nalamboc and fish of Wullar are cooked together and it is a very famous and tasty dish of Kashmir.

Produce/Revenue Realized from Wullar Lake

S. No.	Particulars	Quantity produced	Market Value of produce		Revenue realized by the Govt.
			Rate	Amount	
01	Fish	40,000 Qtls.	1,000/Qntl.	4,00,00,000	60,000
02	Trapa (Singada)	2,00,000 Qtls. or 20,000 Mt.	3.50/KG or 3,500/MT	7,00,00,000	35/Qtl. 70,00,000
03	Nalamboc (Nadroo)	75,000 Qntl. or 7,500 MT	5/KG	3,75,00,000	71,000
04	Khaikharoo	35,50,000 Qtl.	50/Qntl.	175,000	
05	Fire Wood (From Rakhs & Farms Deptt)	25,551 Mds.	10/-/MD	2,55,510	
	Total	37,62,740 P.A.		Average per year	7,52,548

Source : Director of Fisheries, Revenue Department, Rakhs & Farms Deptt.

Khaikharoo

This is a green fodder for animals and is partly used for manure, more than 200 families are dependent on it.

"Beside these important products of Wullar lake there are also some other products found in lake but in small quantity."

REVENUE

Revenue department charges fee from the people engaged in business of products found in Wullar lake.

Revenue realised by the state in the form of licence fee on various produces is Rs. 71.31 lacs annually, while the cost of products from the lake on prevalent market rates roughly come more than Rs. 1658.00 Lacs annually.

EMPLOYMENT GENERATED

Licences have been issued by the Government for fish and trapa extraction from the lake, while more than 15,000 families are dependent directly on the produce of fish, trapa, khai-kharoo and Nalambo. In addition, thousands of people are directly or indirectly benefited by the trade of firewood from its extraction to its final disposal at market-outlets.

<i>S. No</i>	<i>Particulars</i>	<i>No. of Licence Holders</i>	<i>No. of Persons/families dependent directly on the produce</i>
1.	Fish	2000 (Approx.)	More than 10,000 families
2.	Trapa (Singada)	6000 (Approx.)	More than 5,000 families
3.	Nalamboc (Nadroo)	Auctioned Yearly	Mere than 1,000 families
4.	Khai-kharoo	Auctioned Yearly	More than 500 families
5.	Forest/Rakhs and farms firewood trade	Auctioned Yearly	The felling and its transportation is done by the forest department
6.	Grass		

Source : Director of fisheries, Revenue Department.

SOME OF THE HOLY PLACES NEAR WULLAR

Kashmir is a beautiful place in the whole world. It has given birth to many pious personalities.

During my study of Wullar lake I found many holy and religious places, around Wullar. I even visited some of them. But the one which fascinated me and about which I decided to write in my study is about

"Babs Shakur-Din-Wali^{RA}"

The shrine of "Baba Shakur-Din-Wali^{RA}" is situated at the top of the Sharikot hill. It took me 30 minutes to reach to the shrine in car. Although road is clear but I drive slowly as, I had to drive round and round the hill to reach at top.

The management of this shrine gave me some literature, by which I came to know about this pious person.

**LIFE HISTORY OF HAZRAT BABA
SHAKUR-DIN-WALI^{RA}**

It is clear from the history that in the kingdom of Sultan Shahabudin and Sultan Qutubdin (in 790), Hajirat Baba Shakur-Din has taken birth.

From your babyhood you were good charactered and truthful and you had great love for Allah. You were very much punctual of Nimaz and you were reading the Quran very loudly. As you grew up, you started working in your field. You were eating a lot of food and your appetite was not getting over.

Once your mother was carrying food for you in a big basket. On the way two pious met her and asked her for whom she was taking that much of food. Your mother replied that she is taking food for her son who is working in the field. The two pious gave a Quranic verse to your mother and said her to tell her son to say Bismullah before eating food. They also told her to reduce the size of basket every day. The mother of Baba Shakur-Din-Wali did the same. A time reached, when appetite of Baba-Shakur-Din-Wali was getting over with a little food. He was very much amazed at the change and once he asked her mother about the matter, the mother described the whole incident. On hearing this Baba-Shakur-Din Wali asked her mother, where the two pious have gone. The mother indicated towards the south. Baba started his journey through dens, jungles and reached to place known as 'Char Sharief'. There he met one of the pious, Sheikh Noor-ud-Din Wali Baba-Shakur-Din. Wali told the whole story to Sheikh

Noor-ud-Din and he send Baba to Ashmuqam (Anantnag) with an assistant. There he met the other pious Hazrat Zainudin Reshi and spend many years with him to get spiritual knowledge.

After some years by the permission of Hazrat Zainudin Reshi, Baba-Shakur-Din moved towards "Zainageer (near Wullar). Here you got settled at a hill (Sharikot) in a cave, around this hill in Watlab village

A person namely 'Baba Reshi' reached to you, to become your assistant. He worked very hard for you. He used to carry water from a far distance on his shoulders for you. Once you saw some wounds on this shoulders with a lot of infection, you got very much impressed with him. Baba-Shakur-Din said to Baba Reshi that you have served me a lot. God will-definitely pay for it. Baba-Shakur-Din-Wali threw an arrow and asked Baba Reshi to find out where the arrow had fallen. Baba Reshi went in search of the arrow and at last he got it in Tangmarg. He settled himself in Tangmarg area. Baba Reshi gifted a decorated door to Baba-Shakur-bin with his spiritual power. The door itself got fitted, where is present now. Once the villagers shifted the door to other place, but next day they found it on his original place.

Once a Hindu Pandith came to see you. The-Hindu Pandith was a Government employee and had taken some loan from the Government which he could not pay back. The Government was in search of this pandith. The pandith requested Baba-Shakur-Din to pray for him. Baba asked pandith to go back to his home and keep trust in God. When the pandith reached home, he found all his family members happy, he came to know that Government has send him a letter to join the office and collect some amount from Government.

A cow used to visit every day to Baba-Shakur-Din and he used to collect milk from her. Once the owner of the cow followed his cow and reached to Baba-Shakur-Din Wali's place, he watched Baba collecting milk from his cow. The owner of the cow came closer to Baba and told Baba that it was his cow from whom you have collected milk. The owner of the cow knew about the miracles of Baba, so he requested Baba that his cow has not given birth to any calf from last few years. Now the owner of the cow demanded for four to five calves of last few years. Baba told owner of cow to go back to home and have faith on God. Next morning

the owner found more calves in his cow-shed. This miracle of Baba spread through cut and people rushed to Baba with their problems.

Even now people from different religions and from different places of Kashmir come here with their problems and even get solutions.

In 1996 a girl from Malangam Bandipora came to Baba's shrine, whose one hand was not working. The hand of the girl slightly touched the door with spiritual power, her hand became normal.

There are these and many more miracles which the people there told me about you and I even come to know through literature.

It is said that in 870 Hijri (Muslim Calendar) you dug a grave for yourself and jumped into it. The grave automatically got covered. It is also said that in 870 Hijri as your spirit was away from your body you were buried in grave and the grave got covered itself.

27th of Jamidul Sani (Arabic month) is celebrated as your Urs.

People from many places rushed to your holy shrine with lot of hopes. A voice of 'Tanks' are heard sometimes near your shrine, this voice also keeps its image on the windows of all four sides of the shrine. For this reason you are known as 'Toop andaz-i-Kashmir'.

REASON FOR WRITING ABOUT THIS SHRINE

The reason for writing about this shrine in my study is just to tell that during my study I found the Kashmir is not famous as a heaven just for its beauty but also because so many pious people have taken birth here and the worship they have done here. I think that is the reason why Kashmir is heaven.

But during my study about Wullar lake I came to know about the problems faced by the people living near Wullar lake I think these problems are not only faced by them. They are faced by all the people living in the state.

These problems have arisen just from last 12 years.

These problems are responsible for changing this heaven into hell.

And I think, it is only these problems which are responsible for "that piousness and innocence which have left the valley".

And its only because of these problems that even photography is banned inside the shrine of Baba.

FUTURE ACTION PLAN

For preservation of the lake, a comprehensive future action plan in the form of development plan will have to be formulated and implemented. Such development plan must cater to the requirements of all the public and private interests involved directly or indirectly. The development plan must, therefore have to be prepared by a multi-disciplinary agency to be set up by the Government in consultation with the concerned Departments.

Best result can be achieved through integrated development, making a single agency responsible to achieve the objective. For this purpose a Nodal Agency for implementation of the development plan, as in case of Dal lake, will have to be established. In addition to the execution of the development plan, this agency will coordinate and exercise the control over the activities of other departments/agencies. The Nodal agency will have to undertake the contour planning and hydrographic surveys on regular intervals in addition to continuance of hydraulic and silt observations. All this will be required for preparation of the development plan of the lake and its peripheral area. The agency responsible for planning and implementation can best be called "Wullar Development Authority" which would function as an autonomous body to generate economy by implementation of Area Development plan. This would give a boost to the tourist industry besides promoting other economic activities connected with the lake without any detriment to the ecological balance.

At the very outset the anomaly about the lake body has to be removed with the help of Revenue and Flood Control Departments, so that encroachments are removed at the area fully preserved from incursions and its environs developed in a planned manner.

Urban Environment Engineering

Prime concern of the Environmental Engineering Department will be ensure that the ecological balance of the lake is maintained. Inflow of pollution due to nutrients from the adjoining cultivated lands, plantation and the population has to be controlled by devising various economic sanitation measures and treatment/diversion works. And it is in this context that technical guidance of this Department would be solicited.

Irrigation flood control and Public Health Engineering

The flood control measures involving the lake directly or even its surroundings should be in conformity with the activities and requirements of other developmental measures. There should be no interference by any Department at the cost of the activities of other sister departments. Any plans for withdrawal/withholding of water from the lake or discharging water into the take is to be within the basic guidelines of the development plan.

Power Development

The Government is considering erection of Navigational lock control structure (Wullar Barrage) upstream of the old Sopore Bridge near Ningli Nallah across the outfall channel to increase the retention capacity of the lake. In case the proposals of Barrage is approved by the Government, it will be a dominant factor in planning of the development of the lake as it might have great bearing on its ecology.

Town Planning

It can help in finding the layout of the future development plan of the lake and its peripheral area.

Tourism and Sports

The general layout and development of Wullar lake for tourism purpose will have to be blue printed in consultation with the tourism department. It may not be out of place to mention here that only a fraction of home and foreign tourists ever venture to visit the Wullar lake because of lack of infrastructure required. It would, therefore be in the best interest of the tourism department

to gear up its efforts to bring this lake on the international tourism map which would also help in relieving the Dal lake of its congestion.

The lake can prove an ideal rendezvous for aquatic sports such as surf-riding, waterpolo, swimming, diving, rowing, yatching etc. which can be developed to latest standards. Since Kashmir is one of the area where water bodies are abundantly available, it is high time that aquatic games are encouraged in this largest sweet lake of Asia. And no wonder, if this dream materialises, Kashmir may produce a few top ranking water sportsmen in this part of the world. Accordingly recreational zone for sports may have to be earmarked near Laherwal Ghat, which is relatively a calmer zone.

Forests, Rakhs and Farms

In order to check the intestiny of run off and also silt from catchment area, forests and Rakhs and farms departments or any other sister concern will have to plant trees around the lake rather than within the lake as per approved plan. The development of farms for fodder (like Barseem) etc. will have also to be earmarked by the Rakhs and Farms department particularly in those areas where such cultivation would be ideal. Areas within the third line of embankment near Banyari may be suitable for the purpose.

Revenue and Agriculture

This department will have to identify the actual boundaries of the lake and in the process identify the encroachments that have occurred till the date. The department will also have to help actively in removing encroachments and hand over the land belonging to the lake to the Wullar Development Authority.

Nalamboe, Trapa etc. require a steady water supply. The Revenue Department will help in earmarking requirements for such products. They will also identify the spot where such products can be grown easily and developed. However, future expansion of the same will also be kept in mind and areas for such future expansion specified. Research centres to explore ways and means of improving yield of these products can also be set up with the help of the Agriculture Department in the area.

Fisheries

Fisheries Department will have to lay down its policy and give guidelines for the development of fish culture in earmarked zones of the lake. The department will specify their minimum water requirements/level in the lake for the purpose. The lake is an ideal game reserve for migratory birds like the Coot, Laperung, Sand-piper, Red-Shank, Snipe, Gull, Cormorant, Maztard Gadwell, Teal, Pintail and so many other varieties. The games department can help to plan development and expansion of such entertaining game and game resources. Accordingly location of shooting booths (in the light of game light) hypermaton spots, hatching grooves and feeding spots will be essential for framing the development plan.

Panchayats, Local Bodies, Municipal and Town Area

The agencies will have to plan their programme much in advance for implementation through the lake development authority with regard to construction of ghats and public latrines etc., within the stipulated distance from the lake.

Inland Navigation

River Jehlum which inflows and outflows in and out from the lake is one of the prime means of Navigational transport. Since the Government is planning/assessing the possibility of inland water transport system to reduce the vehicular transport intensity on roads, the river and the Wullar lake will be of prime importance. The channels within the lake will have to be drawn for such movement without infringing upon any courses within the lake might need deepening at shallow places for movement of light vessels.

RECOMMENDATIONS FOR PRESERVATION OF LAKE

The following recommendations are made for the consideration of the Government.

Delineation of Lake

To avoid encroachment on the lake area correct and permanent delineation of the lake bodies is must for which the following suggestions are made :

Southern Side

The existing 3rd line of embankment from Sadarkot Pain via Madhwan, Khsurpura, Shah-Gund to Haritar and bunds onwards upto Sopore will have to be strengthened and maintained properly.

Western Side

From Sopore to Watlab existing bunds which happen to coincide more or less with the lake boundary as per demarcation given by the Revenue Department, need to be raised upto R. L. 1580.00 meters and maintained properly. The periphery from Watlab to Ashtengoo is partly undelineated and partly runs along Sopore-Bandipora road. Undelineated portion is proposed to be delineated by construction of marginal bunds.

Northern Side

Northern periphery of the lake from Ashtengo to Bandipora is by and large undelineated and most vulnerable to encroachments. In fact more and more area on this side is being encroached upon and brought under cultivation/plantation. It is proposed to construct earthen bund all along the periphery after being correctly delineated by the Revenue Department. This will not only put an moratorium to further encroachments but will also save the crops grown on the side of proposed embankment from the onslaught of frequent minor and medium floods.

Eastern Side

The boundary on the side stands partly demarcated by L. R. bund built during nineteen-fifties and partly undelineated. It is proposed to strengthen and maintain the existing bunds after removing encroachments if any. The Government may also consider widening of the bunds and its conversion into road from Gurura to Rewat's Bridge. This will not only reduce the road distance between Srinagar and Bandipora but will also reduce the recurring expenditure on maintenance of hilly road stretch from Gurara to Rewat's Bridge. These measures will additionally check inflow of silt pollution and nutrients into the lake besides increase in the retention capacity in case of construction of water Barrage.

SOIL CONSERVATION

Extensive plantation is proposed on all hill slopes.

This will serve three fold purposes as under :-

- (a) Check soil erosion and consequently reduction in silt flow into lake.
- (b) Reduction in nutrient flow to the lake which will consequently check the weed growth and also pollution in the lake.
- (c) Adequate plantation will simultaneously solve problem of firewood in the valley.

DEVELOPMENT OF TOURISM

For development of tourism the following measures are recommended:

- (a) Construction of view points with cafeterias for tourists.
- (b) Construction of Rest Houses.
- (c) Development of tourist plazas at suitable places.
- (d) Provision for motor launches at suitable ghats for tourists.
- (e) Development of Island parks.
- (f) Improvement to Zainalank with access facilities.
- (g) Inland water transport.
- (h) Games facilities.
- (i) Sports facilities.

DREDGING OF LAKE

Dredging of the lake is recommended for increasing the retention capacity of the lake as a flood precautionary measure. The dredged material can be used for construction of marginal bunds along Northern periphery and also raising and strengthening of existing bunds on either sides. The increased retention capacity will be of immense use in case the proposed water barrage comes up ultimately.

CHAPTER 15

THE DRUMS OF DOOM

(A poem on the present state of environment in Kashmir)

MOHAMMAD YUSUF KHAN 'ADIL'

Where there has been suffering, let there be calm,
May the scorched blooms spring to life.

Dark clouds have tarred the sky black,
Let a few spots of sunlight trickle in.

Shadows of gloom darken the plain,
Let there be cool greenery here and there.

The drums of doom resound day and night,
O! How I pine for the sweet rustle of silence.

Flowers and the garden are racked by pain,
Let a cool balm salve the burning slope.

As to who has darkened the firmament,
You will know if you but prod the brain.

Flowers yearn to hear the fairy song,
Just support the wildly swaying branch.

Who blooded the heart of the blossoms,
You could bear the tidings to the *poshinool*.

The grain shall grow, let the woods survive
If the world endures, so shall we all.

Smoke and noise engulf us in a fatal embrace;

* An eminent contemporary poet of Kashmir and lecturer, College of Education, Srinagar, Kashmir.

O! For nature's peace and a soundless calm.

The world could be a musical cradle,
If we but play in it like innocent toddlers.

Ah, the flower is wounded, nearly dead;
The nightingale alone can nurse it back to life.

Once again, let the boats glide on the Jehlum,
And let the Wular heave in the sunset gleam.

The Shalimar is unwontedly turbulent,
The Dal heart-broken, the Naseem silenced.

Why ignite the fuse on a dynamite hill;
Why not muffle the cacophony of death?

I can keep my environs pure and clean,
Only if my reason is cool and limpid.

Nature prays for just a boon, O Adil!
Let all men be pure in heart like you!!

[Translated from the original Kashmiri of Mohd. Yousuf
Khan 'Adil', by M.L. Pandit and M.K. Kaw]

ماحول فریاد

تحریر: محمد یوسف خان عادل سینہ لیکر گزشتہ ڈگری کالج ہمنہ منگر

بے قرار بس اکھ قرارا دی زہے
دو دوش باغس بہارا دی زہے
کالہ او بزن نال وولت تالہ تانی
تاہر چکین ہند جہارا دی زہے
جاہر جلے دد ورن ہند ساہر پیو
سبز زاراہ شہ جہارا دی زہے
رات دودہ چم شہ مشر آہ تن
خامشی ہند اکھ سہارا دی زہے
گل گلشن گل عذارس زور پیو
ناہر بالن شہ جہارا دی زہے
سون ماحول کھ سنا کور داغدار
عقلہ پینے دوسہ جہارا دی زہے
وگنہ دتہ ون گراو پوشتن آرزو
بے سہارس اکھ سہارا دی زہے
کھ سنا دتہ داوی پوشتن کور جگر
پوشتہ کوس اخبارا دی زہے
فطر تک بس اکھ تمنا اکھ دوا
پوشتہ تیلہ ان دن بیکہ آسن زور پاری
پے جہانک سہارا دی زہے
دہہ زور پاری شور محشر باد سس
فطر تک خاموش نظارا دی زہے
اوس ماحول دتہ منزلاہ شورہ وار
بالہ یاراشیر خوارا دی زہے
باگلو دتہ داوی کور ہک نیم جان
بلیس بیو غم گارادی زہے
جہلس پیٹہ بیو دیا سہیں پرند
دوہ کرس آس خمارا دی زہے
ختہ جگر جھیل دل دم پیو نسیم
شالارس اضطرارا دی زہے
شورہ بنہ پیٹہ فتلہ کاکھ چھک دھڑان
موتکس ناس قرارا دی زہے
اوند پوکھ تھاون صفا ایمان میون
کاکھ جاڑک اکھ سہارا دی زہے
عادل س بیو دلدارا دی زہے

CHAPTER 16

Trends in Global Environment Movement

PROF. S. BHATT*

In the context of the study of Kashmir environments, there is need to recall some major developments of the global environment movement. The global environment movement is three decades old. It represents a major concern of contemporary civilization for the stability of this planet and for the future well-being of mankind. This movement has two-fold purposes: to protect the global environments from degradation, and secondly, to ensure sustainable economic development throughout the world.

An Interdisciplinary Movement

The global movement for environment protection has involved all academic disciplines, including science, law and humanities. Indeed many leading thinkers have called for a unity of knowledge in solving environmental issues. Some have called for a new dialogue with nature. To understand nature in an integrated manner has become necessary. Stephen Hawking has in his book *A Brief History of Time* (1988), said that "A complete, consistent, unified theory is only the first step; our goal is a complete understanding of the events around us, and of our own existence". Hence Hawking is not satisfied by the economics of life alone, but considers that the understanding of nature and of our own existence is important.

Another scholar, Fritjot Capra, has in his book *The Turning Point* said that there is a new paradigm coming up in science with

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a shift to a new vision of reality from mechanistic to holistic conception; in which all disciplines are integrated. He says the over-emphasis to rationalism, analytical thinking in science is anti-ecological. Indeed another great historian of science, Gerold Holton from Harvard University has analysed the thematic origins of scientific thoughts from Kepler to Einstein. Science philosophy should aim at providing bridges for understanding on various issues in science and mankind in general, Holton says. In economics too, E.F. Schumacher has referred to new "meta-economics", when economics is not based on consumption, but on "right livelihood". Ilya Prigogine, the Nobel-laureate in chemistry has called for a new dialogue with nature in his thought-provoking book *Order Out of Chaos* 1984. He sees unity in diversity of global science. "Our role is not to lament the past. It is to try to discover in the midst of the extraordinary diversity of the sciences some unifying threads. Each great period of science has led to some model of nature". Prigogine was largely influenced by Indian philosophy based on harmony with nature. (He worked in Texas Prigogine Centre with Professor E.C.G. Sudershan, a distinguished Indian scientist). Prigogine said that we are finding a new synthesis in science between western experimentation and eastern view of self-organizing power of nature. He also points out "It has even been suggested by certain physicists and popularists of science that mysterious relationships exist between parapsychology and quantum physics". On 3rd September 2003, a distinguished gathering of scientists and other scholars including Professor M.G.K. Menon, Dr. Karan Singh held recently a memorial service for Professor Prigogine in India International Centre. The present writer has reviewed the proceedings. Prigogine died early this year.

Prigogine supports Rabinder Nath Tagore's views on the nature of reality. He says that the present global scientific movement is moving in conformity with the views of the great Indian sage—Tagore. Tagore had in his conversation with Einstein said that reality is part of human consciousness, and not apart from it. Tagore's views on creative unity are seen very useful for the global environment movement. Unity in diversity of nature and global life is the essence of reality. Unity of course does not mean uniformity, but harmony, Tagore says. In his book *Creative Unity* Tagore writes:

Our society exists to remind us, through its various voices, that the ultimate truth of man is not in his intellect or his possessions; it is in his illumination of mind, in his extension of sympathy across all barriers of caste and colour, in his recognition of the world, not merely as a storehouse of power, but as a habitation of man's spirit.

Some of views cited above from some leading thinkers of our time provide an integrated view of science and human knowledge, and a new synthesis of science, and new dialogue with nature.

The Role of the United Nations

The United Nations has provided the groundwork for global environment programme. So far there have been three or four landmark declarations by the UN, each at intervals of a decade or so.

The major principles of global environment movement were contained in the UN Declaration for Human Environment 1972. Its report was written entitled *Only One Earth* by a biologist, Rene Dubos, and an economist, Barbara Ward. Both were most outstanding scholars who raised the conscience of mankind to protect global environments.

Major Principles

A few principles of international law referred to in the 1972 Declaration are recalled today as they have become part of global law and behaviour. The Declaration called for a common outlook and common principles to inspire and guide peoples of the world for preservation and enhancement of human environment. The protection of environment was a major issue which affects economic development throughout the world. The problems of environment in the developing countries was due to underdevelopment. Man must use knowledge to combine with nature to better environments. To achieve environment goals was the duty of all citizens, communities and institutions, said the Declaration.

Some other principles of the Declaration called for the right to clean environments, safeguarding of ecosystems of world, protection of wild-life, saving non-renewable resources, preventing pollution of air, land and seas, rational planning by combining economic aspects with concern for the protection of environment,

reducing population pressures on the environment world over, establishing national institutions for the protection of environment, international cooperation in environment issues, and scientific research in environmental matters.

World Charter for Nature 1982

This Charter created a new dialogue with nature. It declared that "Mankind is a part of nature and life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients". It also said that civilization is rooted in nature which has shaped cultures and scientific life. It reiterated that "living in harmony with nature gives man the opportunities for the development of his creativity, and for rest and recreation".

The substance of 1982 Charter was to seek harmony and partnership with nature. UNESCO also produced a book with similar title: *In Partnership with Nature* for worldwide circulation. There was a new hope, new inspiration for mankind to shape a new life of harmony and peace and new economic development by understanding the secrets of nature and the working of ecological systems. The present writer along with a distinguished scientist of India, Dr. B.D. Nagchaudhuri, wrote a book in 1987 entitled *The Global Environment Movement: A New Hope for Mankind*. It created awareness of a new role of man for harmony with nature and with society.

Rio Declaration of 1992 on Environment and Development

The above declaration was made to promote economic development in the world. It announced certain principles for this purpose. Some of these included concerns for sustainable development, sovereign rights of states to exploit resources, development to be future oriented, removal of global poverty, special needs of the developing countries which must be met for development, states to cooperate to restore the health of global ecosystems, laws to be made for environmental standards and environment impact assessment, an open economic system worldwide to be supported, and the role of women and youth for environment management, etc.

The Johannesburg Summit held by the United Nations in 2002 was the latest effort by the UN devoted to promoting sustainable development, after taking stock of the progress of environment management in the world.

India's Progress

India made major contribution for sustainable development measures in the UN conference held in Johannesburg. It produced the following documents of much intellectual impact which include the Montreal Protocol on ozone cell and India's success story, a Report on the state of environment in India 2001, Approaches to Sustainability, Towards Sustainability—Stories from India, Sustainable Development—Learnings and Perspectives from India, Empowering People for Sustainable Development, and, the all important document—Agenda 21: An Assessment prepared by the Ministry of Environment and Forests, Government of India. The present writer has recently published a book on the subject with the title "Environment Protection and Sustainable Development" (APH Publications). In his Foreword to the book Professor M.G.K. Menon writes that "As far as India is concerned, the concept of life in harmony with nature has been an intrinsic part of the psyche, culture, ethics and religions of its people from ages immemorial". No wonder that present global science philosophy is turning towards Indian philosophy of harmony with nature. We may recall here that this Ministry of the Government of India has excellent track record for environment management in the country. It has also established many centres of excellence for this purpose.

SUMMARY

It may be said briefly that the global environment movement is 30 years old. It has given a new turn to the history of mankind. It has called for a new dialogue of man with nature. It aims to promote the unity in diversity of global life. It has produced new science and technology for sustainable development. Through international cooperation, it has promoted peace and prosperity in the world. It hopes to develop a new multi-cultural, multi-spiritual world society. The variety of life in the global society is a source of strength to this global civilization. Mankind is at threshold of long-term harmony and peace, helped by the principles

of environment movement. To the people of Kashmir, these principles form a part of their rich cultural heritage. Hence the environment movement in Kashmir has new hope and message for the people. It is likely to rekindle the spirit of harmony among people and lead to new prosperity through sustainable development.

This seminar is an occasion when many distinguished intellectuals from various disciplines are meeting to discuss issues relating to environments. Their role in promoting an interdisciplinary light for environment management and future progress is an important matter for all times.

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CHAPTER 17

Recent Kashmiri Migration and Impact on Social Environment

DR. RAVENDER KUMAR KAUL*

INTRODUCTION

The word 'environment' as is being used now-a-days has become synonymous with pollution, land degradation, deforestation soil erosion and the like. However, environment is a dynamic and comprehensive term and includes both physical and cultural aspects as well. This paper purposively deals with the latter because there is an interrelation and interaction between physical and social environment. It assumes greater significance in view of the present circumstances in the valley, because no violent society can sustain development.

Kashmir has been the land of saints and seers of sublime order and not surprisingly people call it "*Reshi Vaer*" (The Garden of the Sages) in the local language. Almost every village in Kashmir has produced a saint¹. There is a long list of saints and *sufis* who flourished here from time to time. It is the influence of these serene minds that has dominated the minds of Kashmiri

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people and it is on account of such tradition that Kashmir has perpetually tended to lead mankind towards peace and harmony. Kashmir, in fact, had the indigenous tradition of humanism, tolerance and peaceful co-existence. But unfortunately Kashmir is no longer a 'magical place'.

Kashmir environment, post-1988, has had a sea change. One can see soldiers patrolling the streets in scores, wearing body armour over camouflage fatigues and hefting automatic rifles chained for security to their web belts. Major intersections dominated by sand bagged bunkers, their entrances draped in stout netting to keep grenades out. Paramilitary personnel halting vehicles, shoving the drivers around and rooting beneath seats in search of bombs is a common sight. Gone are the days when busloads of school children and tourists visited the splendid Moghul Gardens and the Dal lake for picnics.

1988-89 has been the watershed with regard to composite cultural environment of Kashmir. The members of the minority community (Hindus) were forced to migrate *en masse* from Kashmir to escape the wrath of the foreign sponsored and locally abetted terrorism. Consequently, the hapless members of the community are scattered all over the country and have become refugees in their own country. Some are languishing in camps, some in tattered tents, some in leaking one-room tenements and others in rented shelters. Not surprisingly, the vagaries of the changed environment, lack of privacy and economic support and the depression caused by displacement have affected them physically and mentally leading to a multitude of diseases (earlier unheard of in the community) and resulted in reduced birth rate and increased mortality rate. Away from their homeland Kashmiri Pandits are lamenting the loss of their homes and hearths. Deep in their hearts they are craving to go back to their roots of rich culture and proud tradition.

Violence has affected every household of Kashmiris—directly or indirectly. It has created widespread chaos, melancholy, distress and depression besides rendering thousands of families homeless. It has taken away innumerable precious lives, left hundreds of innocent children without parents and made young girls widows.

Social fabric of Kashmir has also been disturbed. With the out-migration of thousands of Kashmiri Pandits from Kashmir, villages and villages of Kashmir have emptied. In all 16,979 homes were abandoned by Pandits and 12,278 of them gutted.

Violence in any form and particularly in the form of gun culture is bound to inflict physically, psychologically and economically. It not only maims and 'kills' those surviving violence but dehumanizes, mentally decapitates and severely debilitates even the lives of next generations brought up many years after the violence. Insurgency and conflicts attest the miserable life and worst sufferings of the civilians. Be it Guatemala, Palestine, Mozambique, Afghanistan, Bosnia, Yugoslavia, Chechnia or Kashmir, innocent civilians have been the soft target and the worst affected due to violence—obviously for no fault of theirs.

More than a decade long militancy related violence in Kashmir has orphaned or widowed nearly 17,000 people². As has been seen from violence prone areas, menfolk indulge in violent acts with the aim of gaining political power and authority to rule. They get killed in encounters, locked in jails or tortured leaving behind waiting womenfolk and children to suffer. Women of Kashmir (both in and outside) have suffered doubly because they are the victims and survivors of violence. As victims they witnessed unimaginable suffering, which include the loss of their husbands, homes, sons and other family members. As survivors they continued the violence in both their bodies and memories. They have been burdened with liabilities and subjected to physical abuse and mental trauma.

The past few years have had a grave effect on mental health of the people of Kashmir and identified cases of psychosomatic and psychiatric disorders have tripled. The state has been thrown back into medieval times with even menopausal women continuing to reproduce. The number of illegal abortion centres has increased as have the number of unsafe abortions. There is no screening system for awareness programme for the diseases of the new millennium like AIDS and Hepatitis-B.

The quality of education has been seriously affected by indefinite strikes, intermittent closures, mass copying, favouritism

and other disturbances including several educational institutions being set on fire. According to a recent estimate the drop out rate in schools is as high as 47% at the primary level and 57% at the middle school level, largely because of disturbances, changes in family situations including loss of parents and general lack of interest. These children have been forced into economic activity (child labour) in agricultural fields, orchards, in farms tending livestock and above all in the labour intensive carpet industry. Education system, health services and other developmental activities have come to a grinding halt. Kashmir has become a battle ground of foreign mercenaries pitched against Indian soldiers and Kashmiri civilians. According to a report mercenaries from 14 countries have been involved in the 15 year long proxy war in Jammu and Kashmir. The mercenaries belonged to Afghanistan, Bahrain, Burma, Bangladesh, Chechnya, Iraq, Iran, Kazakhstan, Pakistan, Saudi Arabia, Sudan, Turkey and Yemen besides from PoK³. With the result cattle pastures, soccer and cricket fields and country roadsides have turned into graveyards.

The tragic happenings of terror and turmoil of recent times are an aberration to our great cultural legacy. Despite so much ugliness, most of Kashmir's legendary beauty still remains unscarred. Let us think for a while : Has violence brought an end to any of the problems or has it opened new vistas of debilitating health and sufferings for all ? No religion preaches the adoption of violence as means of achieving political goals. Should we inherit miserable life and psychic trauma to our future generations? No one craves a return to normalcy more than Kashmiris. If anything is happening about Kashmir that is only that the blood of innocent Kashmiris is spilling. And the worst casualty has been the mutual trust, relationship and understanding between the two major communities of Kashmir.

The refugees from Kashmir have the inalienable right to go back to their homes. They can exercise that right only if peace returns and the majority community leadership acts in accordance with the ethic of responsibility that attaches to those who are in majority and power. Should they fail the people it will be a big blow to the ethos of real *Kashmiriyat*. Leaders and intellectuals of both

communities have to join hands to prevent the current drift in the relations. It is both in the interest and tune of cultural ethos that current trend of growing mental, intellectual and cultural distance between the two communities be bridged. Majority community have to put aside the militant threats and stretch forward to build the bridges with the minority community.

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communities have to join hands to work on the common good in the future. It is both in the present and future that the two communities have to build the national identity and work towards a better future with the unity of the community.

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The author of the book has a long and distinguished career in the field of American literature. He has written several books on the subject and has been a leading authority on the subject for many years. The book is a comprehensive survey of the history of American literature from the early colonial period to the present. It covers the major writers and works of the period and discusses the social and cultural context in which they were produced. The book is written in a clear and accessible style and is suitable for both students and general readers. It is a valuable resource for anyone interested in the history of American literature.

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CHAPTER 18

Biodiversity and Environmental Concerns of Kashmir

A.R. WANI*

India ranks amongst one of the most biodiverse countries in the world. And so is the state of Jammu and Kashmir in the sub-continent, with its rich flora and fauna diversity in all the three biogeographical zones of distinct climates. Thus the state in general and valley in particular provides considerable diversity of habitats for its biodiversity ranging from the inhospitable but beautiful snow-capped mountains, permanent glaciers and the crystal-clear and ice cold water in mountain streams, to hospitable habitat like lakes, forests and alpine meadows studded with lovely but mute wild flowers stretching for miles supporting the temperate climate and fresh clean air. There is also the meandering vitasta (Jhelum) normally quiet and placid but, sometimes in the flurry of floods. At one time the river was clear and full of fish (predominantly shizotheraceae), so were the lakes. Today the water bodies Jhelum, Dal, Wullar etc. are rather polluted which has changed their biodiversity regimes. Further more in all these water bodies indigenous fish species have been almost totally wiped out after carp (a non state subject) was unwittingly introduced in these water bodies.

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Kashmir is regarded as the heaven on earth. Indeed the valley was blessed in the past by many sacred saints, but been "Cursed" in the present times. Thus for over decade now, it has not been possible to move through vales and dales of Kashmir and document biodiversity, but it continues to remain a biological paradise, which in fact should prompt any Kashmiri with Eco-sense to save what has yet remained of its biodiversity.

We may boost of being a biomass state of India and the valley is known for export of its fruits and nuts, vegetables and their seeds, medicinal and aromatic herbs, honey, mushrooms, saffron, condiments like caraway (black zera) silk and silken garments, woollen (raffle, pushmina and shahtoosh) carpets (woollen/silken) namdas papier machie, wicker work, sports goods and joinery etc.—All these materials are derived from biomass, much of which is from the biodiversity of the valley.

Another biodiversity is that state hosts a wild relatives of many crops and medicinal aromatic and ornamental plants. There are many ornamental and important medicinal plants growing wild, like aconites, anemones, balsams blue poppy, morina, gentians, marsh gold, primrose, marigold, lilies, violets and others. Animals like Hangul, Musk deer, Brown bear, Leopard, Jungle cat, Martens lynx and unique avifauna like cranes, western tragopans,, Monal cheer pheasants, chakur partridge besides a variety of summer migrants. The Kashmir's trade and economy depend almost exclusively on biological raw materials. Hence there is a situation when people in the valley have depended on natural and man-made bounties and have used these with an element of need and relationship of biodiversity and economy, as is clear from the extent and the nature of dependence of people on biomass. The other traditional source of income has been tourism, which is also biomass - related and biomass dependant, snow, mountains, fresh and clean air high altitude lakes, trout laden streams, wetlands, forests and green meadows, punctuated with beautiful flowers and scenic beauty.

The impact of people and unsustainable development practices is however, seen on these areas, so much so that many habitats and animal and plant species which depend on them have become severely threatened and are on decline and threatened with extinction. This alarming disappearance is resulting in rapid loss

of biodiversity. By losing the species we are losing the potential contributors to states economy and valuable links in natural and biological cycles. Although extinction is a natural process, fossil records on bird shows that on an average only one bird species dies out every 100 years. During the last 200 years investigation of I.B.A programme (B.N.H) report that the rate of extinction has been 40 times greater than this. Taking this as norm one bird in eight could join the extinction list.

Forests

The forest play vital role in protection of ecology and environment, soil and water conservation control of land degradation and mitigation of floods. They are an important source of streams which also support the entire agricultural production system of the valley, besides providing goods and services to the millions of people directly dependant on them.

Decimation of forests

In not too distant past, around 1880s, Kashmir valley could boast of 60-65% of virgin forests, whereas in 1990s dense forest of any consequence were only to the extent of about 37%. In a century, Kashmir valley has lost more forests than in 3500 year of human presence. The decimation of forest must have already started nearly five hundred years back when the *Sufi saint Sheikh Nooruddin Noorani* voiced his concern in his famous saying "An Posh Teli, Veli Van poshr." That the huge Deodar pillars for Jamia Masjid came from Tashwan area of the city shows that forests extended to the edge of the city in 15th century. The gutted shrine of Chararsharif indicates that at one time the entire belt from Nougam to Yus might have been Deodar forests. And only about three to four decades back the Kandi belts of Handwara, Magam, Sopore, Naihari, Ashtangoo, Ajas Chadoora, Achabal, Qazigund, Gutlibagh, Kangan and Wangath area were all dense forests.

Receding Forest Line

The forests have been receding fast in Kashmir. In 1850s fire wood for the city of Srinagar consisted entirely of broad leaved variety—Horse chestnut, Walnut, Maple, Prunus and the Hatab which used to be delivered in boats. By 1900s, forests within

reasonable distances of floating streams were exhausted and by 1950s all accessible high forests came in for excessive commercial felling by private contractors and lessees. With the development of roads to the length and breadth of the valley felling extended deep into upper catchments with disastrous environmental consequences. It also made unauthorized felling and smuggling easier for the unscrupulous elements.

According to a study, women of Lolipora in Pahalgam had to walk twice as much in 1986 than in 1950 to carry head loads of firewood. Same is true for the women of Kaloosa in Bandipora. In nearby Panzigam village the forest have receded more than 2 km within the same period and the Chararsharief people now have to go to Yusmarg, 20 km away to get pony loads of fuel, having more or less finished the forests that stood very near their town.

Forest Exploitation

The State has been exploiting forest since early 1940s. According to forest department (FD) figures, a total of more than 100 lac cums have been extracted from the forests over a period of thirty years from 1970. An analysis of the data shows that over these years, on an average, 1,16 lac trees per year have been felled.

These removals have been on the basis of properly drawn working plans. However, since most of the areas have failed to regenerate, the system has, more or less, broken down. Therefore as a measure of conservation, the annual cut was considerably reduced till felling of green trees was completely banned by the Supreme Court.

Extraction of firewood has been another cause of forest decimation. All along the forest boundary where the villages are settled, scores of women enter the forest regularly, cut fresh seedling and saplings, delimb the big trees and bring head loads of fresh firewood. This practice has been going on for decades, resulting in complete denudation of forests. Particular mention must be made of the period prior to 1990s when fire wood was supplied to Srinagar all the year round and also for winter months to various towns of the valley. This devastating firewood operation forced the authorities to fell even green trees, to fulfil the

commitment. Fortunately now only token supply is made for mosques during winter. The provision of alternate sources of energy have eased the situation somewhat. It must be noted, however, the operation at the village level continues unabated. As per the Wood Balance Study, total requirement of fire wood in the valley for year 1985 was estimated at 293 lac quintals, bulk of which came from forests.

Encroachments

Encroachments are rampant in our forests. The first "authorized" encroachment in forests was in 1948-50 under "Grow More Food" Campaign when forests blanks were brought under cultivation. Thus forests were pock-marked with about 1300 Chaks covering an area of 5,000 ha. These have by now been extended considerably. Although forest department recognizes the menace of encroachments, no authentic data is available about the extent of such incursions. However, on the basis of one official report, area under encroachment in 1996 was around 4,836 ha.

An equivalent area could be considered as not reported. The present position of enthronelement could be safely estimated at above 14,000 ha.

Grazing

There is heavy pressure of grazing in our forests. The entire forest belt, except areas closed for raising plantations etc., is available for grazing for live stock belonging to locals and nomadic people, both having serious ecological consequences on the health of forests. These also have deep socio-political implications.

Tourist Resorts

All the famous tourist places in Kashmir are in forest areas, like Pahalgam, Gulmarg, Koker Nag, Daksum, Achabal, Verinag. The development of these resorts is naturally dependent on the health and regeneration of forest. We need to encourage camps to concerte structures. It would be easy to roll tents to allow ecological relief to the site and extend economic benefit to a different area. Dispersal of tourism is the need of the hour to keep in time with the concept of carrying capacity of environments to encourage Eco-tourism.

Table 18.1 : Forest Area-Kashmir Province.

<i>District</i>	<i>Geographical area (sq km)</i>	<i>Forest area (sq km)</i>	<i>%age</i>	<i>per capita ha</i>
Srinagar	2228	380	17.05	0.05
Badgam	1371	477	34.79	0.13
Anantnag	3984	2068	51.91	0.33
Pulwama	1398	810	57.94	0.18
Baramulla	4588	2778	60.55	0.39
Kupwara	2379	1615	67.89	0.50
Total	15948	8128	50.97	

Note : The above statement is taken out from Forest Annual Administrative Report of 1996-97.

The Extent of Forest Area

What is the real extent of forests in Kashmir and what is the total area? This is a crucial question because we seem to have no reliable data. The statistics are given in Table 18.1.

Again these forests have a long boundary line extending to 35700 kms with recorded 1.90 lakh boundary pillars. Besides the in-forest Chaks have boundary line of about 8,000 kms. In the past the entire forest boundary line used to be secured by properly laid and numbered boundary pillars and the entire line was separated from the cultivated fields by a buffer strip of Khalsa Sarkar and other community lands. Over the years, these have been encroached upon and cultivation has extended deep into the forests and over 3815 are reported diverted to non-forest use with hardly 434 ha brought under compensatory afforestation programme.

Summing Up

From what has been stated above the present state of Kashmir forests can be summed up as under

1. The extent of forest area of 8000 odd sq. kms shown in the FD reports over the past 4-5 decades does not seem to reflect the true situation on ground as no monitoring is done under the present system. Only 37% of the forest have dense cover, the rest is open and denuded and of which 5000 ha are completely degraded.

2. The productivity of forests has considerably gone down to 2.30 cum/ha per year as against the potential of 4.50 cum/ha per year
3. Kashmir forests have considerably declined in their capacity to provide goods and services to the people. These forests which had the potential of yielding 390 lac cft per year has never touched even half of that limit. And as a measure of conservation the annual yield was reduced to 70 lac cft per year in 1990s and further to 50 lac cft subsequently. Now there is a complete ban on green felling as per Supreme Court Orders, which came in force in 1996. Since then, dry trees, dry fallen and other assorted trees are reportedly extracted to fulfil the commitments of sales depots and other sales by State Forest Corporation. This seems to be an ad-hoc arrangement. The sustainability of the system and the policy regarding future management of forests has not been developed as yet. As the matter stands now, our State has taken a downslide from resource-rich stage in the matter of forest to transition-stage moving rapidly towards resource-poor stage, which has serious ecological consequences.
4. The forests occupy hills and mountains which are the store houses of snow and perennial water. The degrading forest eco- system is adversely affecting the hydrological behaviour and water resources potential of catchments.
5. Unrestricted grazing in forest, alpine pastures and sub-alpine blanks is causing site deterioration that affects regeneration of forest species, causing retrogression in grass lands, proliferation of weeds and poisonous grasses apart from trampling of soil by grazing animals. The seasonal migration of nomadic graziers and their stock is of particular importance because of serious ecological consequences on the forests and over all environment which has become grave by restrictions imposed nearer LoC, which has resulted in heavy pressure in lower belt.
6. The status of forest boundary line, demarcating the forest estate from agricultural and other uses, is in a state of disrepair and extensive incursions have taken place at the edge of forests as well as within. An estimated 14,000 ha are encroached although the FD shies away from reporting the actual ground position in their reports. There is no monitoring system in place at present.

Faunal Diversity

The faunal component of Biodiversity of the state is rich, with a variety of interesting and unique forms both in the forest zones and above the forest line besides wetlands. The variety of animals forms range from higher groups like vertebrates, including mammals and birds and lower groups like invertebrates.

The state of Jammu & Kashmir is a unique natural area with diverse zoogeographical realms, with diverse biogeographical zones of Trans Himalayan (Ladakh), Himalayas (Kashmir) and semi arid plains (Jammu). The faunal diversity contributes about 16% of Indian mammals, birds reptiles and butterflies. Among the carnivores leopard, snow leopard, Himalayan brown bear and Asiatic black bear, as well as wild dog including smaller carnivores like fox, martens, are well known throughout their ranges in the state. Both the bears are persecuted for their gal bladder and also the Snow leopard, leopard for skin trade. This has resulted for their extermination from many areas.

Out of 19 species and sub species of ungulates 13 have been listed as globally threatened and receive complete legal protection. The most important is Hangul, the sub species of European Red deer, the viable population of which is restricted to Dachigam National park. Both the sub species of markhor viz., flare horned markhor (*capra falconeri falconeri*) and Pripanjal markhor (*Capra falconeri cashmirensis*) are restricted range species, and fall to poaching.

Smaller mammals like shrews, bats, marmots, voles are restricted to high altitude, whereas hare and porcupine are in lower reaches.

Avifauna

The Avifaunal diversity varies seasonally most of these are migratory and arrive from the plains of Indian subcontinent during summer mainly for breeding, but also by way of local migration. In Migratory water fowl viz., Grey leg goose and mallard, poachards, teals, pintails, shovlers, cormorants, brahminy ducks, arrive from Siberian breeding grounds for wintering. Wetlands of Hokera, Wullar and Hygam are their main settling areas.

About 45% of mammalian diversity of the State is listed as globally threatened in IUCN Red data book, and 34% is included in schedule I of Wildlife Protection Act. There are several species of animals which have either been wiped out completely or are on the verge of extinction due to poaching, grazing competition with domestic livestock and degradation of habitat, for instance, Tibetan gazelle which was once fairly common in Changthang area in Ladakh has been exterminated from most of its range, Himalayan Thar has been wiped out from the cliffs of Kishtwar. Serow is another species which has not been seen recently. There are other species like Tibetan antelope (*Panthera tibetanus*), lynx (*Lynx lynx isabellina*), pallas cat (*Felis manul manul*), long tailed marmot (*Marmota sibirica*) etc. under various degrees of threats.

Amongst birds, white frosted goose, white headed duck, European black vulture, long belled vulture, western tragopan, chir pheasant. Black necked crane, Kashmir fly catcher, and several species of warblers are threatened.

The conservation status of the fauna though not encouraging however finds reference in J&K Wildlife Protection Act, and several other laws like Environmental Protection Act, Pollution Control Act. Steps to frame a revised forest policy do reflect the commitment of state government to preserve Biodiversity in the state and make forest policy predominantly conservation oriented. Several NGOs have also come up to create awareness about Environment, noteworthy being a serious campaign lodged by the Peoples Ecological COUNCIL under the patronage of former minister of Environment and Forest (GOI) Prof. Saif-udin Soz.

WETLAND SITES AND THEIR ENVIRONMENT

Kashmir valley is replete with diverse types of fresh water bodies. Majority of these natural aquatic system are shallow basined and classified under western Himalayan wetlands. Zutshi & Khan 1978 in a classic typology recognized three major categories of water bodies: Valley lakes (1580-1600 m) of Kashmir, Forest lakes (2000-2500 m) of Pir Panchal range, and Glacial high altitude (3000 m). Hydrological Valley lakes have been sub categorized in to drainage (e.g. Dal lake, Wular lake) Semi-drainage (Naran bagh) and Non-drainage (Trigam sar) type. The valley lakes/

wetlands are mostly located in the flood plain of River Jehlum and River Sind and are characterized by varying in Hydroedaphic features. All these wetlands detailed below are linked with each other. Linkage map of migratory waterfowl is endorsed.

Problems of catchment of the lake

1. Population pressure
2. Grazing pressure
3. Deforestation
4. Encroachment
5. Faulty Agricultural practices
6. Soil erosion
7. Use of Fertilizers and Pesticides
8. Lack of awareness for conservation

Problems within the lake

1. Siltation
2. Shrinkage of area
3. Weed infestation
4. Encroachments
5. Change of Land Use
6. Raising Willow plantations
7. Deterioration of water duality
8. Sewage & Sewerage disposal

A brief description of the wetlands is given as under:-

1. WULAR LAKE

It lies between 34°-16' to 34°-26' N latitude, 74°-32' to 74°-42' E longitude with an elevation of 5180 ft. This is the largest lake in Kashmir. The outline of the lake is irregular with an average depth of about 16 ft with an area of 65 sq km. It has a fluvial type fresh water origin.

The lake is fed by six catchments and river Jehlum bringing in runoff from entire valley. Six catchments around lake are:

1. Erin
2. Madhumati
3. Wular-I (Watlab-Bandipora)
4. Ningli
5. Wular II (Safapora-Ajas)
6. Gundafsha

2. DAL LAKE

It lies between 32-54' latitude to 75-02' longitude at an elevation of 5,200 ft situated in the east of Srinagar city. A kidney shaped lake with an area of 1,058 ha. It comprises of Hazartbal, Nigeen, and Nehru Park basin. A great tourist attraction. It has a fluvial type of fresh water origin.

3. MANASBAL LAKE

It lies between 33-51' latitude to 74-44 longitude. It is situated about 30 km north west of Srinagar in the direction of Wular lake. It is oblong shaped in east-west direction. The lake area is about 280 ha and is a great tourist attraction next in popularity to Dal lake. It has a fluvial type of fresh water origin. The village Kundelbal needs to be immediately shifted and land use around lake restricted. Introduction of Grass carp an experiment underway by *fisheries department must be stopped forthwith.*

4. ANCHAR LAKE

It lies between 34-24' N latitude and 74-82 E longitude. It is situated about 10 km from Srinagar with an area of 5.3 sq km. It is mainly fed by Sindh stream and is connected to Dal lake through nallah Amir Khan. Utilisation activities range from agriculture to cultivation of wicker willow plantations and raising vegetables under heavy biotic pressure. It has a fluvial type of fresh water origin. Waste water disposal from Sheri Kashmir Institute of Medical Sciences into the lake needs to be diverted.

5. SHALLABUGH

It is adjacent to Anchar Lake to its west at the confluence of Sindh Nallah and exit of Anchar. It is an erstwhile game reserve famous for SNIPE shooting. It has heavy pressure 'of human activity, particularly Reed harvesting. It has a fluvial type of fresh water origin.

6. HOKERA

This wetland is fluvial in origin and is located at a distance of 15 km from Srinagar on Srinagar-Baramulla National Highway. It is permanent, but is relatively a shallow water body with main water source from Doodganga flood channel. The utilization

ranges from agriculture activity, grazing, and hunting to fisheries. Now hunting/fishing has been restricted. The wetland has been a famous game reserve, and is now proposed for Wildlife sanctuary. It is subjected to varied anthropogenic pressures due to urbanization of its surroundings including encroachment, siltation and eutrophication posing threat to its survival. It is a fluvial type of fresh water origin. Immediate steps are needed to divert flood channel by raising bund along Soibug by Wildlife Department.

7. NARAN BAGH

Located about 25 km from Srinagar, the water body is semi-drainage type with major part of its drainage basin being calcareous. It is essentially an oxbow type with alluvial sediments. Water supply is mainly from springs within its basin. Activities related to Agriculture and Horticulture, besides fisheries, are the main sources of human interference. It is a fluvial type of fresh water origin.

8. AHANSAR

It is located about 30 km from Ahansar town. It is also a semi drainage type of water body with major part of the water supply coming from springs within the lake basin. It is subjected to human interference similar to Naran Bagh wetland. It is a fluvial type of fresh water origin.

9. TRIGAMSAR

Located in the flood plain of Jehlum, Trigamsar is about 25 km to the west of Srinagar. The water is permanent non drainage, shallow and is very turbid. It has been under impact of heavy biotic interference due to harvesting of fodder and plants and fishing. The water body is ecologically highly polluted. A part of water body has been converted into a fish farm by Dept. of Fisheries.

10. MIRGUND

It is a shallow wetland of fluvial origin about 20 kms south-west of Srinagar on way to Gulmarg. Although a temporary wetland, it attains a depth of about a meter at places. Water supply is mainly from Sukhnag nallah and channels irrigating surrounding paddy fields. The water body is extensively used for harvesting

fodder and also grazing livestock. The horticulture and arboricultural activities are spreading on its fringes. The water body has been a popular water fowl hunting area, next to Hokera. The ecological problems besides grazing is that of encroachment, siltation and eutrophication. The wetland is a notified Wildlife Reserve. It has a fluvial type of fresh water origin.

11. HYGAM

It lies between N. Latitude 34-13' to 15' to E. Longitude 74-33' and is 5 kms from Sopore close to Wular lake and drains into Wular through Tarazoo. Its main water source is from Ningle Nallah and Babakul. It is about 7.25 km in area. It is an erstwhile popular waterfowl hunting area. Like Hokera it is under heavy pressure of grazing on fringes, encroachments and siltation from agricultural fields and farming.

12. INDRANAGAR

It lies between latitude 32.54' and longitude 75.02' at an elevation of 5,200 ft. It is situated 2 km from centre of Srinagar and is under administrative control of Army cantonment. It has been reported 20 ha in area but is now hardly 8 ha in patches. It is a perennial wetland having springs within lake basin. Highly urbanised process of reclaiming the wetland is going on unchecked. It is highly polluted by effluents from domestic sources. It is an ideal site for building/construction within city for a nature interpretation centre to create environmental awareness.

13. CHATLAM

It lies between latitude 34.1.5' to 75.02' at a distance of 5 km from saffron town of Pampore and 30 km from Srinagar. It has an area of 20 ha. It was initially a Game Reserve but is now being managed for fisheries with a fish farm adjacent to it. It is a spring fed wetland. The shores of the wetland are elevated and form a long stretch of stratified deposits of fine grained sand and loam. It is a good resting site for migratory water fowl having flyway linkage with Hokera/Dal etc.

14. SHILWATH

Shilwath is one more important wetland which is in a bad state and needs immediate attention on the part of Government.

PRESENT STATUS OF WETLANDS

Wetlands in the state have undergone a tremendous change; many have lost their pristine glory of clean, deep blue waters and biodiversity. Over years, deforestation in the catchments have brought tonnes of silt into the wetlands that have facilitated unabated encroachments within and out side the lake areas resulted in urbanisation, mushrooming tourist infrastructures, sewage and effluent discharge coupled with rapid proliferation of weeds. All this biotic interference has seriously disturbed the natural ecosystems. Increasing population pressure, land reclamation for agriculture and aquaculture, uncontrolled grazing, eutrophication and weed infestation coupled with floods have brought about ecological degradation of these sensitive systems. The result is the depletion of endemic flora and fauna, and a great damage done to erstwhile rich biodiversity. Some of the major threats to the wetland and their Ecosystems are:

Pollution/Eutrophication

Inflow of domestic waste and runoff from agriculture fields in to the lakes and rivers has resulted in increased organic loads, adversely affecting the aquatic fauna and flora. Deteriorating ecology and high nutrient load has brought about colonisation by macrophytes. At places, native species have been totally replaced.

Land reclamation/Agriculture

Unplanned plantations around and within the wetlands has reduced the water spread and volume of the water. These man-induced disturbances like change of vegetation, drawing out water for agriculture purposes, land reclamation for cultivation etc. have created havoc in most wetlands. The total area of Wular Lake at Ramsar site has been reduced to 65 sq km. thereby reducing its flood absorbing capacity as well.

Siltation/Floods

Heavy siltation on account of soil erosion in the catchments, inadequate flood control measures and unplanned network of irrigation channels has brought about shallowing of water bodies and also the deterioration in water quality of our lakes like Dal, Wular, Anchar, Hokera, Hygam etc.

Introduction of exotics

Introduction of non endemic species of fishes like common carp has a deleterious effect on indigenous faunal diversity and has resulted in almost disappearance of many valuable fish species like *Shizothorax* in Kashmir valley.

Measures to counter threats to Wetlands

Despite India being signatory to the Ramsar convention on wetlands of international importance, these Ecosystems have been, as said in the foregoing, undergoing increasingly greater threat due to poor and unscientific management. Our state has great potential to conserve and develop its wetland resource in a sustainable manner. To achieve this objective, to protect the sensitive, fragile and critical species and habitats need to be developed on sustained basis. The present scenario of wetlands of the State of J&K demands a comprehensive interdisciplinary approach to deal with the problem by assisting rather dictating nature. We must create an awareness and highlight the importance of its wetlands supplementing human dietary requirements and their ecological significance in terms of flood control, water purification, aquatic productivity and the role these wetlands have been assigned by our creator in regulating micro-climate and ground water system.

Following majors are suggested to check further deterioration and restoration of wetlands in all the three regions of our state viz., Jammu, Ladakh and Kashmir.

Siltation/Flooding

- (i) Afforestation of catchments.
- (ii) Sediment removal / Treatment of Catchments.
- (iii) Silt traps at feeder canals, diversion of Doodganga flood channel at Hokera diversion of Ningal Nallah and Balkul to save Hygam.
- (iv) Protection / Development of canal and river bunds.

Land Use Practices

- (i) Check on encroachments.
- (ii) Controlled grazing in catchments.

- (iii) Check excavation and dredging.
- (iv) Stop cultivation of steep/slopping lands.
- (v) Popularize terraced cultivation of hill slopes in the catchments.

Pollution control

- (i) Develop proper sewerage system.
- (ii) Improvement of inflow and outflow water channels.

Weed Control

- (i) Selective weeding, giving preference to manual extraction of weeds over mechanical mode of removal
- (ii) Increase water circulation.

Habitat improvement

- (i) Fencing and water conservation measures adopted.
- (ii) Regulated harvesting of fish and other sustainable resources of the wetland.

Environmental Education/Research

- (i) Environmental awareness education programmes in educational institutions.
- (ii) Coordinated applied research undertaken with the Universities of Kashmir and Jammu.
- (iii) Supporting NGO organisations like HOPE (an environmental group), Green Kashmir & Nature to hold seminars and workshops on wetland conservation, educating masses about socio-economic and environmental role of wetlands and need to preserve these for posterity.

Constitution of State Wetland Advisory Board

Since various interacting departments are actively involved in one way or the other with the wetlands and their catchments, it is necessary to promote an interdisciplinary approach to wetland management. They involve multiplicity of interests ranging from fisherman to farmers, herders to hunters, bird watchers to tourist activities, foresters, agronomists, Sheep and Animal Husbandry men, Pisciculturists and administrators. As such, wetlands can not be managed in isolation from other ecosystems. It is therefore essential to constitute an interdisciplinary policy framing authority

to evolve wetland conservation strategies for the state. It suggests constituting of Wetland Conservation Advisory Board on the pattern of National Advisory Wetland Board. The Board should represent following interests:

- (i) **Catchments:** The concerned departments are that of forests, Sheep & Animal Husbandry and Wildlife Protection department.
- (ii) **Lake Areas :** Fisheries department, Lakes and Waterways Development Authority, Department of Tourism and Dept. of Wildlife Protection.
- (iii) **Research and Development :** The Universities of Kashmir and Jammu, SKUAST Kashmir, Jammu and National Institute of Aquatic Ecology and SACON (Salim Ali Centre for Ornithology and Natural History, Coimbatore).

These departments must be represented by the departmental heads on the State Wetland Advisory Board besides the following official and non-official members to be nominated by the Govt. of J&K.

1. Principal Secretary, Forests, Environment, Fisheries and Wildlife.
2. Principal Secretary Agriculture and Animal Husbandry.
3. Divisional Commissioners, Kashmir and Jammu.
4. Director General Tourism.
5. Representative of Ministry of Environment and Forests, Govt. of India.
6. Professor Saif U Din Soz Member Parliament.
7. Dr. D.P. Zutshi, Prof. Emeritus Jawaharlal Nehru University, New Delhi.
8. Representative from SACON, Coimbatore.
9. One representative of NGOs from each region *viz.*, Kashmir (HOPE), Ladakh (WWF) and Jammu.
10. Representative of Asian Bureau of Wetlands, New Delhi.
11. One non official eminent retired officer of IFS cadre of the rank of Pr Chief Conservator of Forests having experinece interest and knowledge in the Preservation of Wildlife and Wetlands.
12. Representatives of Peoples' Ecological Council.

The Board should be headed by the Chief Minister with Minister for Forest, Environment, and Fisheries as its Vice

Chairman and the Chief Wildlife Warden, J&K as its Member Secretary

Wetlands that need immediate attention are :

- Dal lake
- Nigeen Lake
- Hokera
- Hygam, and
- Wular

Dal Lake and Nigeen Lake

The problem in these two world famous water bodies is socio-economic and ecological. Unfortunately the emphasis has so far been on engineering aspects only. Socio-economic aspect needs to be tackled on priority basis. Once the hamlets within Dal/ Nigeen are shifted to alternate sites, ecological problems addressed can show the results for restoration of lake.

Sewage and sewerage from the hamlets within the lake and from city habitation around lake pours into the Dal and Nigeen directly. The disposal/drainage system to take off the sewage/ sewerage needs to be addressed forthwith and on priority basis. Removal of hamlets needs to be tackled urgently by allotting them alternate sites and paying them compensation.

Rehabilitation of the Dal dwellers has to be done in consultation with them keeping in view their trade/work culture. For example, the Fishermen have to be rehabilitated nearby so that they can undertake their day to day work with ease.

Houseboats have to be relocated in such a manner on scientific lines to enable sewerage disposal through a common sewer. It is proposed that existing bund from Nishat to Rainawari be widened and mooring sites developed on either sides of the bund / road providing enough land with each houseboat to construct modern kitchen with attendants room, a septic tank, and a small garden common to two houseboats.

Floating Gardens/Raads should be vacated by people after paying due compensation, or allotting them the reclaimed land on northern side of the foreshore road (Shalimar side), for raising vegetables.

Similarly following problems facing Nigeen lake need to be addressed to on a priority basis:

1. Diversion and treatment of sewage.
2. Removal of Raads and restrict proliferation of lotus straps and lily cultivation.
3. Attention to problems of stagnation of Central Zones and northern Part of Lake.
4. De-weeding
5. Houseboats
 - (a) Disposal of sewage through a proper overland drainage system
 - (b) Permission to construct small kitchenettes-cum-attendant's room on shore land close to Houseboats, well connected with a sewer.
6. Removal of Lepor Hospital
7. Public awareness through local NGO's like Jheel Dal Protection Union and NLCO.

Wular

The master plan prepared by the department of Soil Conservation/Environment needs to be put to public hearing.

Hygam

Encroachment though partly restored, further action is warranted to retake entire belt encroached. Silt arresting traps need to be constructed to arrest slit from Balkul and Ningle Nalla.

Hokera

Flood Channel to be diverted and bund construction continued beyond Soil Bug. Urbanisation around wetland should be stopped. RESEARCH station in collaboration with SACON (Slim Ali Centre for Ornithology and Nature) should be established with the financial support from the Ministry of Environment and Forests.

CHAPTER 19

Conservation of Wetlands in India

DR. SIDHARTH KAUL

INTRODUCTION

Wetlands of India are distributed in different geographical locations and they differ not only in climatic conditions but changing topography as well; this is a causative factor for great diversity in various ecological parameters. Wetlands have assumed great significance because of their role in recharging of aquifers as water is becoming a rare commodity because of population pressure and urbanization.

Beside recharging of aquifers, these water bodies play a crucial role in serving as life support system as in providing food, fodder, fuel and water for domestic irrigation and industrial purposes. They are also of immense socio-economic and cultural importance to communities living around in these areas which include number of livelihood activities like fisheries, agriculture, navigation, growing of vegetable, etc. Their role in maintaining natural biodiversity for survival of rare and endangered species of flora and fauna cannot be underestimated. By virtue of natural functioning, wetlands help in regulating hydrological regime, flood control apart from recharging of aquifers.

Due to pressures of human activities, these water bodies are being polluted which result in their deterioration and shrinkage in size. Encroachments, siltation, weed infestation, discharge of

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domestic sewage, industrial effluents and surface run-off carrying pesticides and fertilizers from agricultural fields are the major causative factors for their present plight which gets reflected in deterioration of water quality, prolific growth of aquatic weeds, decline in biodiversity and shrinkage in size.

Wetlands are complex hydrological and biological ecosystems being transitional between terrestrial and aquatic ones. As per Ramsar's definition, Wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters.

Valley of Kashmir has nature's gifts of these wetlands which are suitable niches for fish, winter resort variety of game birds migrating from other neighbouring countries for shelter and breeding purposes, besides a good source for food, fodder and other economically biological products. During the last decade or so, emphasis has been made on research and development component of wetlands so as to integrate different disciplines in the sector and to come out with mathematically functional time relationships between soils, environmental factors, minerals and living organisms. In other terms, emphasis is laid on ecosystem analysis where in all the components starting from primary producers to secondary producers and onwards to decomposers is studied in depth so that some predictive model is prepared on the basis of data generated which can be replicated anywhere for their conservation and management.

The development and concept of ecosystem has created scope for integrated studies of biotic and abiotic factors. Nutrients added to freshwater ecosystems are largely utilized by organisms, incorporated into biomass and ultimately sedimented as organic or inorganic materials. It has been demonstrated that nutrient built up in plants and their growth is correlated with soil features, climatic conditions and other biotic/abiotic components. Many diverse ecosystem processes are concerned with the circulation of chemical elements and plant growth which is essentially of a polycyclic nature with both long and short term cycles being involved. Prediction of biomass as a combined function of many parameters has been established as interesting aspect to go deeper

into details and so is about nutrient cycling, food chain at different trophic levels and factors affecting decomposition in these ecosystems.

Realising the importance of fresh water bodies for providing food, fodder, fuel and water for domestic, irrigation and industrial purposes; their role in supporting fisheries; number of rare and endangered species of flora and fauna; maintenance of natural biodiversity; helping in regulating hydrological regimes, flood control and recharging of aquifers etc., Govt. of India operationalised wetland conservation programme in 1985-86 in close collaboration with concerned State Govts. These steps were taken mainly due to degradation and shrinkage of water bodies due to encroachment, siltation, weed infestation, catchment erosion, surface run-off, carrying pesticides and fertilizers from agricultural fields and discharge of domestic sewage and effluents which resulted in deterioration of water quality, prolific weed growth, decline in biodiversity and other associated problems.

25 wetlands were identified for conservation and management where financial assistance was released to the concerned State Govts. For supporting activities like survey and demarcation, weed control, catchment area treatment, desiltation, conservation of biodiversity, pollution abatement, educational awareness, community development etc. (Annexure I).

State Steering Committees were set up in each State under the chairmanship of Chief Secretary having members from concerning departments involved in wetland management. Members also include NGOs and academicians from Universities. 100% funding was given for these activities but taking into consideration meagre amount of assistance available, it was not possible to cater to these issues in a meaningful manner.

In 1993, National Lake Conservation Plan was carved out of the Wetland Conservation Programme to focus on lakes particularly those located in urban areas which are subjected to anthropogenic pressures. 10 lakes were identified for conservation and management (Annexure II). A project for Rs. 637 crore was made for conservation and management for these 10 identified urban lakes but due to financial constraints, the project was not approved and Ministry was asked to try for external donors for funding the scheme.

In spite of various measures initiated by Govt. of India, following gaps were observed:

- the approach adopted is more of curative nature than preventive one.
- ad hoc approach was taken up for limited activities which consisted of more of engineering activities for the catchment area treatment.
- Interactions of local communities, their social and economic status and their dependence on wetland resources was not properly analysed.

Use of traditional knowledge in monitoring mechanism and analysis of stakeholders was not given due attention.

Crucial need of the hour

Considering above facts, a comprehensive management action plan needs to be taken up in totality to undertake sustainable development of selected wetlands through catchment area treatment, water management, sustainable resource development, biodiversity conservation, community participation and its involvement in planning and management.

Strategy needed

- to emphasise shifting the current focus on curative measures to a preventive approach with limited engineering interventions.
- to build technical and managerial capabilities and to address the issues of sustainable development of the wetland resources.
- To integrate social and ecological dimensions which are inter-related and inter-dependent for sustainable management.

MANAGEMENT ACTION PLAN (MAP)

Management of the wetland require a thorough analysis of demands of different stakeholder groups and their impacts on the ecosystems. The following project components will be the focal points of MAP.

Catchment Area Treatment

This will include survey and mapping, assessment of land use patterns, use of remote sensing and GIS techniques to find out drainage pattern, vegetation cover, faunal distribution, siltation, encroachment, control of silt erosion by check dams, contour bunding, gully plugging, plantation etc.

Water Management

This will include inflow, outflow pattern, hydrological data collection, determination of infiltration, interception; soil moisture; assessment of inflow, outflow of water through various channels including ground water; point and non-point sources of pollution; weed control; water quality; flood mitigation etc.

Biodiversity Conservation

Under this component, identification of rare endangered and endemic species will be assessed and conserved through in-situ and ex-situ methods. This will also involve delineation of water body into different zones for management of biodiversity and for utilisation of wetland resources.

Sustainable Resource Development

Assessment of current resource utilisation pattern, economic valuation of wetlands, eco-friendly recreational activities and sustainable utilisation of water for drinking, irrigation and industrial purposes will be undertaken under this component.

Community Development

This will involve socio-economic aspects including livelihood issues, assessment of resource availability, stakeholder analysis, utilisation of wastes and aquatic weeds for energy generation, alternative/additional income generation programmes, role of women in development strategy, health and sanitation of community living around wetland area, etc.

Apart from above components, institutional framework, legal and policy issues, capacity building, monitoring and evaluation etc. will also form a part of the project for financial assistance.

This would help in the rehabilitation of the selected water bodies and sustainable utilisation of their resources. This would help to improve water quality, enhanced biodiversity and would also restore the aesthetic appeal of urban lakes for recreational purposes.

India is signatory to Ramsar Convention which is an inter-Governmental treaty for conservation of Wetlands all over the world. During a single year, 13 new sites have been added

from India to the List of wetlands of International Importance (Annexure-III).

It has been an era of achievements as our country was chosen for the Ramsar Conservation Award for its work on ecological interventions in Chilka lake. India was not only first Asian country to get this award but Chilka wetland which was under Montreaux Record, has been taken out of this list because of the sound ecological management of the lake for which an international mission was sent to look into management interventions undertaken for conservation of this water body.

Our efforts at international level have greatly been lauded. India was a Standing Committee member from 1993-96 and again from 1999-2002. We were also instrumental in developing Community Education & Participatory Awareness (CEPA) Resolution right from inception which was adopted at 8th meeting of Conference of Contracting Parties (CoP-8) at Valencia held in November, 2002. We also co-chaired a group on "Agriculture and Wetlands" with Slovenia which drafted another resolution and got it approved through the contracting Party Preparatory sub-Committee for CoP-8; which was held in Valencia in November, 2002.

Apart from these international achievements, something has also been achieved at national level. Wetland authorities have been set up in various States like Loktak Development Authority in Manipur, Chilka Development Authority in Orissa, Lakes & Waterways Development Authority in Jammu and Kashmir, Shore Area Development Authority in Andhra Pradesh, to name a few. The purpose of these authorities is to smoothen and consolidate wetland conservation programme undertaken in identified wetlands in different States.

Draft Wetland Conservation Strategy is being attempted. Government of India has also formulated policy and strategy on biodiversity and Biodiversity Bill has already been passed which includes conservation and sustainable management of biodiversity.

A notification has been issued declaring coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by the tidal action in landward side upto 500 m from the high tide line and the land between the low tide line and the high tide line as the Coastal Zone Regulation Notification, 1991

under the provisions of Environment (Protection) Act, 1986. This imposes graded restrictions on setting up and expansion of industries, operations and processes. This notification is of great importance for conservation and wise use of wetlands. The Environment (Protection) Act also specifies protection of ecological fragile areas under which a number of wetland ecosystems in the country are notified.

- Sustainable development and water resource management of Loktak lake, a Ramsar site, is under implementation jointly by Ministry of Environment and Forests and Wetland International. The project is community based involving participatory approach for catchment area development, sustainable fisheries and wildlife management.
- Another UNDP project on "Survey and Mapping of wetlands, less than 56 hectare area" is under implementation by SAGON which has already mapped 72 districts in various States. This will definitely give more information about small satellite wetlands which have tremendous impact on larger wetlands in question.
- An effective role is being played by NGOs to save wetlands. Environment Society of Chandigarh, the local people and school children have been participating in conservation moment called "**Shramdan**".
- Several environment awareness campaigns for wetland conservation are being carried through various educational institutes.
- Environmental information system has been set up to promote networking for generating awareness for values and functions of wetlands.
- Several wetlands in India, notably East Calcutta wetland in West Bengal, are used for treatment of sewage and utilizing waste resource for agriculture, fisheries development and vegetable cultivation.

These are some of the initiatives taken by Government of India at national and international level which is not enough and much more is needed to save deterioration of these wetlands which are basically pillars for survival of humankind, particularly in regard to water scarcity which is going to play a crucial role in coming decades.

Apart from various measures undertaken for wetland conservation in the country, it is imperative to constantly review

and monitor management processes undertaken in various identified areas with the aim to tackle wetland conservation in an integrated manner. Our aim is to find out long term solutions which are not curative but preventive so that we can proudly inherit these natural and multiple-use ecosystems for future generations without compromising on sustainability and development.

ANNEXURE I**List of Wetlands**

<i>Name of Wetlands</i>	<i>State/UT University</i>	<i>identified for collaboration</i>
1. Wullar	J & K	J&K University
2. Tso Morari	J & K	—do—
3. Tisgul Tso	J & K	—do—
4. Renuka	Himachal Pradesh	Himachal University, Shimla
5. Pong Dam	Himachal Pradesh	—do—
6. Chandratat	Himachal Pradesh	—do—
7. Harike	Punjab	Punjab Agricultural University, Ludhiana
8. Ropar	Punjab	—do—
9. Kanjli	Punjab	—do—
10. Chilka	Orissa	Utkal University
11. Kabar	Bihar	Bhagaipur University
12. Sambhar	Rajasthan	Jodhpur University & CAZRI
13. Kolleru	Andhra Pradesh	Osmania University
14. Loktak	Manipur	Manipuri University
15. Ashtamudi	Kerala	Kerala University
16. Sasthamkotta	Kerala	—do—
17. Ujni	Maharastra	Pune University
18. Nalsarovar	Gujarat	Gujarat University
19. Deepar Beel	Assam	Guwahati University
20. Rudrasagar	Tripura	Tripura University
21. Hokersar	J & K	—
22. Mansar-Surinsar	J & K	—
23. Pangong Tsar	J & K (Ladakh)	—
24. East Calcutta	West Bengal	—
25. Sundarban	West Bengal	—

ANNEXURE II

List of Lakes (Urban)

S. No.	State/UT	Name of Lake
1.	Jammu & Kashmir	Dal
2.	Chandigarh	Sukhna
3.	Madhya Pradesh	Sagar
4.	Uttar Pradesh	Nainital
5.	Tamil Nadu	Kodaikanal
6.	Tamil Nadu	Ooty
7.	West Bengal	Rabindra Sagar
8.	Maharashtra	Powai
9.	Andhra Pradesh	Hussain Sagar
10.	Rajasthan	Udaipur

ANNEXURE III

List of Wetlands of International Importance under Ramsar Convention (India)

Name of Wetland	Date of declaration	State/area	
1. Ashtamudi Wetland	19/08/02	Kerala	61,400ha
2. Bhitarkanika Mangroves	19/08/02	Orissa	65,000ha
3. Bhoj Wetland	19/08/02	Madhya Pradesh	3,201ha
4. Chilika Lake	01/10/81	Orissa	116,500ha
5. Deepor Beel	19/08/02	Assam	4,000ha
6. East Calcutta Wetlands	19/08/02	West Bengal	12,500ha
7. Harike Lake	23/03/90	Punjab	4,100ha
8. Kanjli	22/01/02	Punjab	183ha
9. Keoladeo National Park ^{MR}	01/10/81	Rajasthan	2,873ha
10. Kolleru Lake	19/08/02	Andhra Pradesh	90,100ha
11. Loktak Lake ^{MR}	23/03/90	Manipur	26,600ha
12. Point Calimere Wildlife and Bird Sanctuary	19/08/02	Tamil Nadu	38,500ha
13. Pong Dam Lake	19/08/02	Himachal Pradesh	15,662ha
14. Ropar	22/01/02	Punjab	1,365ha
15. Sambhar Lake	23/03/90	Rajasthan	24,000ha
16. Sasthamkotta Lake	19/06/02	Kerala	373ha
17. Tsomoriri	19/08/02	Jammu & Kashmir	12,000ha
18. Vembanad-Kol Wetland	19/08/02	Kerala	151,250ha
19. Wular Lake	23/03/90	Jammu & Kashmir	18900ha

ANNEKURE II
 List of Wetlands of India (Tamil)

Sl. No.	Name of Lake
1.	Chandigarh
2.	Madhya Pradesh
3.	Uttar Pradesh
4.	Tamil Nadu
5.	West Bengal
6.	Madhya Pradesh
7.	Uttar Pradesh
8.	Tamil Nadu
9.	West Bengal
10.	Madhya Pradesh

ANNEKURE III
 List of Wetlands of International Importance under
 Ramsar Convention (India)

Sl. No.	Name of Wetland	Area (Hectares)
1.	Ashtamudi Lake	10,000
2.	Chandigarh	10,000
3.	Madhya Pradesh	10,000
4.	Uttar Pradesh	10,000
5.	Tamil Nadu	10,000
6.	West Bengal	10,000
7.	Madhya Pradesh	10,000
8.	Uttar Pradesh	10,000
9.	Tamil Nadu	10,000
10.	West Bengal	10,000
11.	Madhya Pradesh	10,000
12.	Uttar Pradesh	10,000
13.	Tamil Nadu	10,000
14.	West Bengal	10,000
15.	Madhya Pradesh	10,000
16.	Uttar Pradesh	10,000
17.	Tamil Nadu	10,000
18.	West Bengal	10,000
19.	Madhya Pradesh	10,000
20.	Uttar Pradesh	10,000

CHAPTER 20

Changes in Environment of Kashmir

DWARKA NATH MUNSHI*

Esteemed Ladies and Gentlemen, Namaskar

The Kashmir Education, Culture and Science Society has done me great regard and honour to have given me this opportunity of being with you to learn and talk on a matter of special importance and urgency.

It is very rarely that one sits down to collect one's thoughts on a subject like environmental protection and sustainable development in Kashmir. Which in fact should normally be of primary concern for our mental and physical health and economic well-being, and no less spiritual pursuits, over the entire span of our life from birth to death. Yet it is a sad fact, amazing as it may be, that Kashmiris generally, and the urban sectors in particular, have been almost wholly insensitive and uncaring in the matter of environment, its essence and value in our life.

Perhaps nature was too indulgent in showering its benedictions on the land that was heaven on earth. As an axiom goes, maybe with a touch of sarcasm, "plenty breeds profligacy". We squandered the immense environmental wealth in almost total disregard of

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common-sense and responsibility. This has been the state over long periods till we have reached the point of poverty, almost bankruptcy, in this vital aspect.

This may sound strident and clothed in cliché. But the memories of my childhood of 70 years ago, my carefree adolescence and romance of youth are pretty strong, though not too wide and deep in this regard, which impels me so. I ask your forgiveness for taking you back a half century or more, to illustrate my point.

We then lived at the edge of a chunk of land in the heart of Srinagar. My great grandfather had put all his heart and soul in converting it into a beautiful garden with a few running fountains and water courses, which was plentiful. By the time I inherited it, the pretty piece had lost some of its sheen but was still green and charming.

On the other side of the house flowed the nala Maar. The Maar was a clean, serene network of water courses, taking off from the legendary Dal lake, with canals criss-crossing the city in several areas, and proceeding in grace to meet the Anchaar lake, another marvellous vast sheet of water. This was a play field of the young and the restless Shikarees, wealthy visitors come from beyond the seven seas. For the locals it was a much sought after source of subsistence additional to the substantial yield of fish and fowl. The hunters lived and proliferated in what looked a dense jungle of willow and tall green grass sitting on the lake's waters only a few kilometres from the city.

As we grew, the Maar started drying up and eventually gave up the ghost. The process was mortifying. The refuse of the city was filling it up. Before Independence, the Maharaja, a sworn environmentalist, got it manually dredged twice to revive it. But the growing urbanisation and loosened control, and utter mindlessness proved too much for the dying beauty.

While still alive and flourishing, the mother Maar had also floating on it small boats—decorated shikaras—for the curious foreign tourists, as well as bigger boats for ferrying cargo.

It soon got filled up with all the garbage, refuse, filth and much else coming down into it from one of the most dirty cities anywhere, which has no organised sewerage system, lamentably

even today. Perhaps, had there been a little careful thought and imagination, the dead Maar could have still served a great purpose as an efficient, economically developed sewerage system, even allowing to build the road that is now over it. That would have provided a double-purpose essential service for the filthy city. Only the grotesque overtook the sublime.

And whatever has happened to the once crystal waters of the enchanting Jhelum, that broad-bosomed beauty, revered and beloved of the people of all creeds and persuasions. On its ample banks, the young roamed and gossiped and sang the now forgotten tilting lyrics of Kashmir. The old and the pious meditated and prayed in the Mandirs and mosques and washed their cares in its rippling waters.

That pride of Kashmir is only a decrepit stream now, sad and sorrow fill carrier of carcasses and disease.

The water has shrunk and receded all over lakes, springs, ponds, wells and the all-important streams. As the anguished and elderly say with a cold sigh, the gods have put the unthinking mortals on notice against the unmitigated denudation of the woods and forests. Even their own favourite abodes are not spared. The world-renowned Dal lake has shrunk almost by half. Gone are its famous floating gardens, grabbed by the greedy, land-hungry people, to form the base and create land out of water, so to say. To advance their ill-gotten commercial holdings, they channel all garbage and refuse from the houseboats around to the chosen spot. A few more miraculous manipulations turn it into solid multipurpose earth unconcerned about the damage to general environment.

It is the same with the Anchaar where, it is reported, a part has been now put under the plough. The mighty Wular lake and the pure delight that was Manasbal and many others are in much the same state, as the land-hungry keep driving the water farther away.

These waters were always a feast to the eye, that would touch a new life into everything—animals, birds, trees, young and old alike.

These would also lend a special grandeur to the hills and mountains in the background and around them. Take for example

the holy hillock of Hari Parbat. From atop its gentle slopes, one would see breath-taking sights on every side. On one side lay the shimmering waters of the Dal lake as far as one could see, whose cute bunds were studded with stately trees of demure willow and tall poplars embellishing it like a massive necklace. There the swan would spread out its silvery wings to proclaim its sovereignty over the ducks and the numerous water birds which provided sustenance and delightful dishes to the locals and the merry makers.

The view on the other side of the hill was of a sea of pink and white almond blossom right up to the edge of the gold fields of mustard flowers dancing in the breeze. All this is a dream now. The entire area has been swallowed by human habitation, with its attendant excesses in relation to the requirements of a healthy and economically productive environment.

The mountains and meadows are left denuded. The forest produce of numerous varieties and even most valuable and rare wild life has been destroyed. An unbelievable, pathetic part of it all is that the imperious Chinar, the pride of the State and home to many birds, and the walnut and mulberry trees, which were base of the wood-based luxury handicrafts and the famous Kashmir silk, were felled with a frenzy of vengeance at the stroke of the Awami Raj 1947 onwards. The madness was rooted not in any political reason but to insensibly take it out on the authority of the preceding rulers who had, with good economic sense, protected them under a successfully enforced law in the interests of none other than the violators themselves.

In short, these chilling facts brought about a deep disharmony not only in the environment but in human behaviour and relationships and no less in most other animate and inanimate factors and elements.

Take the birds as an example which are gradually disappearing, the hoopoo of fanciful colours announcing the arrival of a smiling spring, the boisterous bulbul, the fakhta of dainty plumes and ecstatic notes, or even the mighty kite or eagle and numerous others. Mother nature created them to procreate and perpetuate their species and ordains for all beings to maintain a balance in ecology and in environment for a happy living.

This tempts me to offer some innermost thoughts and fancies to underline the vital role of environment protection and promotion for the general good. The Hindu has been characterised as idol worshipper not so much showing respect to the practice as conveying one's non-belief. The Hindu has, however, gone beyond the idol in that he has worshipped, respected, protected all creations of nature which form the totality of what constitutes the environment. From water in the sea to the tiny spring, from reptiles to the rodent, from meek and gentle to the most ferocious of wild life, the wind to the fire, mountain to desert, in short the Hindu sees divinity in all living and existing elements, animate and inanimate, having been assigned their respective roles and purposes.

That perhaps was the surest means, for everyone, at all different levels of the intellect, to protect the elements for one's own sustenance.

To conclude, ladies and gentlemen, the world has been going through ever-growing phases of change, development and modernisation, generally at the heavy cost of degrading of the environment. Happily, however, it has started realising the negative aspects of the galloping pollution and damaging the environment.

In our State we have not yet reached the point of no return, because of the slow growth of industrialisation and of the polluting agents. Modernisation is no doubt necessary. Yet more imperative is to keep the genie of pollution and degradation ever in sight and control from the planning stage onwards.

Mr. President and the exalted members of the audience, I must have taxed your patience listening to what you got from me today which was anything but the technical and directly ameliorative suggestions and advice. Perhaps that was inherent in the descriptive and the allegorical portions. If you grant that, I would be happy to leave in a harmonious environment.

CHAPTER 21

Our Rare Legacy : Chinars, Lakes and Posh Nools

CHANDRAKANTHA VESHIN*

This time I visited Srinagar after a lapse of thirteen years. The lakes of the valley, the *chinars*, the rivulets, the ducks swimming in rows, the innumerable multicoloured birds chattering under the shade of the stately trees of the Char Chinari island, and the pure cool winds blowing from the ice-clad mountain peaks, all these had beckoned to me in my dreams all these years. The ever-full Vitasta of the olden days that seemed to hold up the houses on its banks recurred in my memory, but I could not visit the valley. Events moved to so fast in this period. Time and circumstances snatched everything from us. Not only did the outer environment get destroyed, we also suffered a lot in terms of mental anguish.

When I descended at Srinagar airport, my old memories accompanied me wherever I went. As soon as I entered the city, I could sense the changed environment. Even in the sixties, the open fields and green pastures had been encroached upon, but now even the *chinar*, *deodar* and *kikar* trees appeared to have staged a retreat. Numerous jungles of brick, cement and mortar

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flourished instead. The cool scented revivifying breezes of yesterday had been replaced by the smoke and dust generated by buses, trucks and scooter-rickshaws.

It is clear that this era of globalisation has compelled the world to be changed too fast. Commercialisation and consumerism have deprived us of our cultural roots and traditions. We are in the grip of a valueless society that has destroyed its own environment. We cannot console ourselves by repeating parrot-like the old adage: "If there is a heaven on earth, it is here, it is here, it is here". While the terrorism of the last thirteen years has held us in its vicelike grip and we can hold outsiders responsible for this, no such excuse can explain away the extensive damage and destruction that we ourselves have inflicted on the environment through our careless, irresponsible and self-serving attitudes. We have all participated in this ignoble venture of destroying the beautiful and turning it into an ugly shadow of its former self. We forgot that when we receive sustenance from the soil, air, water and greenery of our land, we also owe a debt of responsibility towards them. We exploited nature and did not respect its treasures of lakes and forests and consequently we are suffering untold miseries and shall continue to do so if we do not mend our ways. The earth has an infinite capacity to suffer, but she sometimes warns us by showing her anger. Floods, droughts, earthquakes, landslides, disappearance of wild life, drying up of lakes and springs, change of temperature etc. are some of these danger signals.

I was totally devastated by the damage suffered by the city of Srinagar in the past few years. When our memories and dreams collide with the cold reality outside us, we are subjected to untold mental suffering and anguish. I stayed in a Five Star Hotel on the bank of the Dal Lake. It had modern facilities, good food, everything. May be, we need dozens of three-star and five-star hotels to house the tourists, but our real treasure is the natural beauty of the Kashmir valley and this is getting destroyed every year.

I sat at the window overlooking the Dal lake for hours in the evening. I could see the Chakreshwar temple on the Hari-Parbat and the temple, the mosque and the gurdwara all at the same locale. It was a grand example of our culture. I could see the Dal

Lake, with which so many memories of my childhood and youth are linked. Thankfully, a few *chinars*, *deodars* and *kikar* trees are still there, but the lake no longer looks like a lake, it is more like a dried-up river. The houseboats at the other end of the lake looked so close, one could almost touch them with outstretched hands. Where had that vast expanse of wavy blue water stretching over miles disappeared to, I wondered? The houseboats waiting for tourists in the midst of a muddy lake threw trembling lights on the crests of the waves.

I kept on looking for the lake of my childhood, in which we used to travel by shikaras for our picnics. Then we had the cool breeze coming from the snow-clad hills of Ishbar, Nishat, Chashmashahi and Shalimar. Today when you venture out on the Boulevard Road, the smoke-filled wind brings tears to your eyes. The smoke spewed by trucks, buses and three-wheeler rickshaws is spreading everywhere. The smoke has covered the whole of nature with a layer of soot. The Vitasta looks like a small dried-up drain. There is moss in the lake and also the refuse thrown by the households living on its banks. It was here that poets like Mahjoor and Nadim sang of love and beauty. They were inspired by the grand spectacles of nature. They could empathize with the glory of nature and relate the deepest human emotions to it. They could visualize the innocent childlike flowers opening their mouths, looking at the milky waterfalls and springs emerging from the breasts of the hills. Nadim saw here the birds showing their wounds to the roses all night long. The Rishis, Sufis, Shaivite, Buddhist and Islamic saints were inspired to think of love, cooperation and brotherhood because of the awe-inspiring beauty of the landscape, the stately Chinars and the cold springs and waterfalls spouting from their mountain sources. They sang and wrote their sentiments in *vaakhs*, *shruks* and *sufiana kalam*, thus setting an example to the whole of humanity.

Now all that has changed. Gone are those days of leisure and culture. I took a shikara ride and visited all the old haunts at Nehru Park, Char Chinari and Nishat, but I could not recreate the milieu of my memories. All the open spaces of Nehru Park, Polo Ground, Sher-e-Kashmir Park, Gol Park etc. have been turned into business centres and shopping areas. We have tried to break the freedom-loving beauty of nature into walled enclosures. So much illegal construction of residential houses and shops has taken place that

the lake has had to shrink. Where there were open spaces in the past for the deer and hangal to gambol about freely and for the birds to fly about, now there are hotels, bazaars, golf courses and such other places of enjoyment for the edification of the tourists. The trees have disappeared. The area with forest cover has shrunk. Rare species like the Hangal have also disappeared. How long can the lakes keep on digesting the tonnes of waste and refuse that are thrown into them?

I had visited Srinagar last in 1986. At that time, the blue waters of the Dal lake had danced in the cool scented breeze. There was a whole world of growing species in the lake. Lotuses bloomed and the rows of ducks seemed to laugh. Jagmohan, then Governor of the state, had started a campaign to restore the lake into its primordial colour of blue. But today the face of Dal Lake has again lost its lustre.

We have several problems. The problems of increasing pollution, depletion of forest cover, disappearance of wild life, encroachments, replacement of natural areas by concrete jungles are significant ones. These have not only demolished the pristine beauty of the landscape, but also damaged our natural heritage. Bazaars, colonies, hotels and increased fleet size represent our needs and epitomize "progress". We can have them sooner or later, but we cannot buy the gifts of nature, the fascinating chirping of multicoloured birds and poshnools, the breeze dancing in the leaves of pines and chinars and the soul stirring music of gushing torrents and waterfalls. We have to remember this and also to transmit this knowledge to our children, as to how we should protect and preserve our flora and fauna and how important they are to the maintenance of the earth's balance.

Today, the world is waking up to the danger being posed to the environment. Efforts are being made to protect the planet. Not only large countries but also even small village communities have started coming alive to the threats to our ecology. A tribal village surgoda in Orissa, with a population of just 550 persons, has demonstrated such a fine sense of environmental awareness as to bag the Indira Priyadarshini Vrikshamitra Award for 1989. The poor people of this village are dependent for their livelihood on bamboo weaving, carpentry, milk production and daily wages employment. They supplement their income by making *donas* out

of *sal* leaves. They depend on the forests, but they repay more than they take from the forests. Planting new trees and looking after them is a religious duty for them. In Chhattisgarh, the forests of Sarna are like places of pilgrimage for the tribals. Cutting even a leaf from a tree is considered to be a sin. Our forefathers prescribed worship of trees, land, fire, air and water, because they appreciated their importance. Such feelings held by tribes can be transmuted into a duty for all citizens of the country. We form forest protection committees, but these hardly lead to protection of forest areas. Till the day that the masses do not join hands with government agencies to protect the environment, deforestation will take place, vehicles will spout smoke, we shall continue to create fresh unauthorised colonies and we shall be the victims of Nature's fury.

Even a country like the USA, with all its affluence and despite being seated on top of the techno-economic pyramid, has to demonstrate a commitment to the goals of environmental conservation. A century-old tree in the Sunny Vale Park of California has been fenced off for posterity. In the Sea World Park of San Diego, not only are rare marine species preserved, but both adults and children are taught to care for them. On the other hand, we in India tend to treat precious natural treasures as our personal property, to be exploited at will. No doubt we also have wildlife sanctuaries and national parks at Periyar, Kaziranga, Jim Corbett, Bharatpur, Nandan Kannan and Dachigam. But with what intensity of passion do we protect them? The time has come when we should consider why our deer and hangul are disappearing.

I recall the words of Baba Dyom, the renowned conservationist of Africa, that have been reproduced at Sea World Park. These need to be taught to our children. He says:

*"For in the end, we will conserve only what we love,
We will love only what we understand,
We will understand only what we are taught."*

How true this is; we have to imbibe this *mantra* ourselves and teach it to our children. Only then shall we first understand, then love and finally conserve our environment - the trees, the plants, the animals, the birds, the rivers, the lakes and all the other precious objects of our natural heritage.

हमारी नायाब विरासतें : चिनार, झील और पोशनूल

इस बार पूरे तेरह वर्षों बाद श्रीनगर जाना हुआ। अपनी वादी की झीलें चिनार, झरने झीलों में कतार बांध तैरती बतखें, चार चिनारी के घने छतनार चिनारों बीच कुहुकते बेशुमार सतरंगी पांखी और बर्फ ढके पहाड़ों को छूकर आती शफ़फ़ाक हवायें हमें स्वप्नों में बुलाते रहे। किनारों पर घरों को थामे भरी-भरी वितस्ता हमारी यादों पर दस्तक देती रही। पर हमारा जाना नहीं हुआ। इस बीच वादी में काफी कुछ घटा। वक्त और हालात ने हमसे काफी कुछ छीन लिया। हमारे बाह्य पर्यावरण का ही विनाश नहीं हुआ, हमारे भीतरी संकट भी गहरा गए।

श्रीनगर हवाई अड्डे पर उतरी तो अतीत की स्मृतियाँ हर कदम पर ताल मिलाकर साथ चलती रहीं। शहर में प्रवेश करते हुए ही बदले हुए, माहौल के अहसास ने घेर लिया। यों खुले खेत और हरियल चरागाह तो साठ के दौर से ही सिकुड़ने लगे थे, अब चिनार, देवदार और वीर कीकर का हराभरा परिवेश भी सिमटा-सकुचा नज़र आया, जिसे बेशुमार ईट-पत्थर काक्रीट के जंगलों ने ग्रस लिया है। वादी में कदम रखते ही हरी-कचहरी गंध लिए शफ़फ़ाक हवायें, जो प्राणों को संजीवनी की छुअन देती थी, वह यातायात के शोर-शराबे, बसों, ट्रकों और तिपहिए स्कूटरों के काले धुएं और धूल-धक्कों से घुटी-घुटी लगी।

यह सही है कि ग्लोबलाइजेशन के इस दौर में आज, जब पूरी दुनिया अन्धाधुंध बदलाव की तेज़ गिरफ्त में चक्करघिन्नी खा रही है, प्रगति के नाम पर उपभोक्तावाद और बाजारवाद ने हमें अपनी विरासतों से महरूम कर, मूल्यहीनता और पर्यावरण विनाश जैली गंभीर समस्यायें दी हैं, हम अपने कश्मीर को कल्हण के युग का, धरती का स्वर्ग बनाए नहीं रख सकते। गर फिरदौस बार रूप ज़मीन अस्त, हमी अस्तो हमी अस्तो हमी अस्त कहकर हम अपने को भ्रम में भी नहीं रख सकते। पिछले चौदह वर्षों में आतंकवाद के ख़ूखार पंजों ने भी हमें और हमारे प्रदेश को गहरे ज़ख्म दिए हैं, रौनकें लूटी हैं, जिसके लिए हम भले गैरों को ज़िम्मेदार मान दोषी ठहरा सकते हैं, पर यह भी सच है कि हमने खुद अपनी लापरवाही, गैरजिम्मेदारी और निजी स्वार्थ के लिए अपने प्रदेश को कम बेरौनक नहीं बनाया। एक खूबसूरत चेहरे को बेनूर बनाने के लिए हम सभी, जनता और सरकारें जवाबदेह हैं। हम भूल गए कि मिट्टी, पेड़, हवा, जल जो हमें

जीवन देते हैं उनके लिए हमारी भी कोई जिम्मेदारी है। हमने प्रकृति का दोहन किया विरासत में मिली नायाब सौगातों, झीलों, वनों की कदर नहीं की और इसके परिणाम अब भुगत रहे हैं और आगे भी, यदि हम संभले नहीं तो भुगतने होंगे। पृथ्वी के सहने की क्षमता अपार है पर अपना आक्रोश वह समय-समय पर दिखा कर हमें चेताती भी है। बाढ़, सूखा, भूकंप, पहाड़ों का रिड़कना, वन्य जीवों का धीरे-धीरे गायब हो जाना, झीलों-झरनों का सूखना, तापमान में परिवर्तन, इसकी कुछ बानगियां ही है।

हमारे शहर ने कितना कुछ खोया है पिछले वर्षों में इसकी पीड़ा मुझे बराबर सालती रही। हमारी स्मृतियाँ, हमारे स्वप्न और आकांक्षाएँ जब बाह्य यथार्थ की बेस सच्चाईयों से टकराती हैं तो मन में द्वन्द्व और तनाव को जन्म देते हैं। मैं झील डल के किनारे बने फाइवस्टार होटल में रही, जहां आधुनिकतम सुविधायें, बढ़िया भोजन वगैरह उपलब्ध था फाइवस्टार थ्री स्टार होटलों की कतारें, अंधाधुंध फैलते बाजार शायद जरूरी है हमारी आर्थिक प्रगति के लिए टूरिस्टों को आकर्षित करने के लिए, लेकिन जो मुख्य आकर्षण है कश्मीर के अनिधन और अनछुए प्राकृतिक सौन्दर्य का, उसको हम किसी भी कीमत पर नज़र अंदाज नहीं कर सकते, पर दुःख की बात है कि ऐसा हुआ है। और हो रहा है। मैं देर रात तक झील डल की तरफ खुलती कांच जड़ी खिड़की की सीध में बैठी, दीठ के सामने हारी पर्वत था, पहचान पहचाना, चक्रेश्वर का मंदिर, प्रांगण में मंदिर, मस्जिद और गुरुद्वारा, हमारी सांझी विरासतों की मिसाल। दामन में हमारी प्यारी झील, झील डल, जिसके साथ हमारे बचपन और यौवन की खुशनुमा यादें जुड़ी हैं। शुक्र है कुछ चिनार, वेद और कीकर के पेड़ अभी भी किनारों पर खड़े हैं पर झील, अब झील नहीं, सिकुड़ी हुई नदी लगती है। दूसरे किनारे खड़े हाऊसबोट इस किनारे से इतने पास लगे कि हाथ बढ़ा कर छू लें। वह मीलों मील फैला नीले पानी का लहराता विस्तार कहां खो गया? टूरिस्टों के इंतज़ार में खड़े हाऊसबोट, मैली झील में रौशनियां फेंक, पानी की घड़कनों में कांपते नज़र आए।

मैं बचपन की उस झील को दूँढती ही रही, जिसमें ढोंगो, शिकारों में बैठ हम पिकनिकें मनाते रहे हैं, इश्वर, चश्माशाही, निशात शालामार की बर्फ ढकी पहाड़ियों को छू कर आती नम हवाएं, जो रूह को सुकून पहुंचाती थी, बुलिवार्ड पर सैर करते, काले धुएं का गुब्बार उठाती आंखों में करक भरने लगीं। ट्रकों, बसों, तिपाहियों का जहरीला धुआं चौतरफ

फैलता जा रहा है। पेड़-पौधों, झीलों-नदियों के उजलें रंगों पर, मायूस गर्दों गुब्बार ने मैल की परतें जमा दी हैं। वितस्ता सूखा नाला नज़र आती है, झील में काई मंगोल और किनारों पर बने घरों का मैल कूड़ा यहां वहां तैरता देख दिल में कचोट उठी। यहीं प्रकृति के विराट सौन्दर्य से मुग्ध और गर्वित होकर महजूर और नादिम जैसे कवियों ने प्रेम और सौन्दर्य के गीत लिखकर उनमें मानवीय राग-विराग की घनीभूत संवेदनायें पाईं। पहाड़ों के सीन से झरती दूध की धार देख मासूम गुलों के दहाने खोलने की कल्पनाएं यही जन्मी। नादिम ने यहीं गुलालों को रात-रात भर जाग, गुलों को अपने सीने के जख्म दिखाते देखा। वादी में प्रकृति के अकूत सौन्दर्य, धुले निखरे सुआपंखी पत्तों, छतनार चिनारों, पहाड़ों से झरते ठंडे पानी के छलछलाते झरनों ने, यहां ऋषि, सूफी, शैव, बौद्ध और इस्लामी सन्तों को प्रेम सौहार्द्र और आपसी सद्भाव की प्रेरणायें दीं। वाख, श्रुख, सूफियाना कलाओं और संगीत से वादी को भर कर दुनिया के लिए मिसाल बना दिया।

लेकिन अब न वे फुरसतें रहीं, न माहौल। पुरानी यादों को जीने की ज़िद लिए, मैं शिकारे में बैठ नेहरू पार्क तक गई, चार चिनारी, निशात। पर मुझे स्मृतियों का मोहक परिवेश नहीं मिला। चार चिनारी नेहरू पार्क पोलो ग्राउंड के आस पास के खुले स्थल शेर कश्मीर, पार्क, गोल पार्क बिज़नेस सेंटर और बाजारों में तब्दील हो गए हैं। उन्मुक्त प्रकृति को हदों में बांध कर हमने वादी की खूबसूरती के साथ खिलवाड़ किया है, झील किनारों के अवैध निर्माण, घरों और दूकानों की पौंते झील में घुस गई हैं। खुले विस्तारों में जहां पशु पक्षी, हिरण-हांगुल मस्ती से विचरते थे, अब टूरिस्टों को मददेनज़र रखकर होटल, बाजार, गोल्फ के मैदान और क्या-क्या न बना है, पेड़ों की कटाई और वन क्षेत्रों का घटते जाना, हांगुल जैसे नायाब जीवों का दृश्य से गायब हो जाना, हमारे लिए चिन्ता का विषय है। झीलें कब तक मलबे-कूड़े के ढेर अपनी छाती में जप्य करती जिन्दा रहेंगी? 1986 में श्रीनगर आई थी उस वक्त झील का नीला पानी, हवाओं से थिरक उठा था। झील के भीतर की वनस्पतियों का अनूठा संसार और खिलवतरों बीच कमल के गुच्छों को हंसते देख, बतखों की पातें हंसती नज़र आई थी। तबके गवर्नर जगमोहन जी ने सफाई अभियान चलाकर झील को निर्मल बना दिया था पर आज वह खूबसूरत चेहरा फिर से मैला हो गया है, यानी फिर वैताल उसी डाल पर।

समस्यायें, चिन्तायें अनेक हैं पर पर्यावरण बढ़ता प्रदूषण, कटते जंगल, घटते हुए वनक्षेत्र और वन्य प्राणी, अवैध निर्माण, और पेड़-पौधों की जगह ईट-कांक्रीट के उगते जंगल, हमारी प्राथमिक चिन्तायें हैं। इसने वादी का सौंदर्य ही नहीं छीना, हमारी नैसर्गिक विरासतों को भी गहरा धक्का पहुंचाया है। बाज़ार कालोनियां, होटल, बढ़ते वाहन, हमारी जरूरतें हो सकती हैं प्रगति के सूचक भी, इन्हें हम देर सवेर बनाकर समृद्ध हो सकते हैं, पर सतरंगी चिड़ियों और पोशनूलों की मोहक बोलियाँ, चीड़-चिनारों में थिरकती निर्मल हवायें, और झीलों झरनों का रूह को तस्वीन देता संगीत हम किसी भी बाज़ार से नहीं खरीद सकते। यह बात हमें याद रखनी ही है, और अपने बच्चों को भी सिखाना है कि हम वैसे इनका संरक्षण कर सकते हैं, कि पृथ्वी का संतुलन बनाए रखने के लिए जीवगंजंत।

आज पूरा विश्व पर्यावरण संकट के प्रति जागरूक हो रहा है। धरती को बचाने के यत्न किए जा रहे हैं। बड़े राष्ट्र ही नहीं छोटे गांव भी इस ओर सजग होने लगे हैं। उड़ीसा के एक आदिवासी गांव 'सुरगुड़ा', जहां कुल 550 लोगों की बस्ती है, से पर्यावरण के प्रति अद्भुत जागरूकता दिखाई है जिसके लिए उन्हें 1989 में इन्दिरा प्रियदर्शिनी वृक्ष मित्र पुरस्कार मिला। अपनी आजीविका के लिए बांस की बुनाई, बढ़ईगिरी, दूध उत्पादन और दैनिक मजदूरी पर निर्भर यहां के निर्धन लोग सालवृक्ष के पत्रों से दोने बनाते हैं। वनों पर निर्भर हैं पर जितना उनसे लेते हैं, उतना लौटाते भी हैं, नए पेड़ उगाना, उनकी सार संभाल करना उन्हें धार्मिक दायित्व लगता है, छतीसगढ़ में सरना के जंगल आदिवासियों के लिए तीर्थ स्थान जैसे हैं, जहां पेड़ों से एक पत्ता तोड़ना भी पाप समझा जाता है, हमारे आदि पुरुषों ने वृक्ष, भूमि, अग्नि, वायु और नदियों का महत्व समझ कर ही उनकी पूजा का विधान रखा। आदिवासियों की यह भावना आज हमारी नैतिक जिम्मेदारी है। हम वन सुरक्षा समितियाँ बनाते हैं, पर वनों की कितनी सुरक्षा हो पाती है हम जानते हैं। जब तक आमजन और सरकार दोनों प्रतिबद्ध होकर पर्यावरण संरक्षण की जिम्मेदारी न संभाले, तब तक जंगल कटते रहेंगे, वाहन ज़हर उगलते रहेंगे, अनधिकृत बस्तियां बनती रहेंगी और हमें प्रकृति के कोप का भाजन बनना पड़ेगा।

आज अमेरिका जैसा सम्पन्न राष्ट्र भी अपनी आर्थिक-तकनीकी प्रगति के शीर्ष पर बैठे होने के बावजूद पर्यावरण के प्रति बेहद जागरूक हो रहा है। कैलिफ़ोर्निया के सन्नीवेल पार्क में, एक सौ वर्षीय वृक्ष की घेराबंदी

करके उसे अगली पीढ़ियों के लिए न्याती समझकर सुरक्षित रखा गया है, सेन डियागो के सी वर्ल्ड पार्क के नायाब जीव जंतुओं, समुद्री जीवों का संरक्षण ही नहीं होता, बच्चों-बड़ों को उनसे प्यार करना भी सिखाया जाता है, जबकि हम प्रकृति की अमूल्य धरोहरों को निजी जागीर समझ उनका दोहन करना अपना अधिकार समझते हैं। यों तो हमारे देश में भी जीव जंतुओं के संरक्षण के लिए सेंकचुरीज़ है। पेरियार, काजीरंगा, जिम कारबेट, भरतपुर, नंदन कानन और अपनी वादी में दाछीगाम जैसे संरक्षण पार्क है, पर कितनी निष्ठा से हम उनकी देखभाल करते हैं? क्यों हमारे यहाँ हिरन और हांगुल गायब होते जा रहे हैं, इस पर गंभीरता से सोचने का समय आ गया है।

मुझे सी बल्ड पार्क में लिखे, अफ्रीकी पर्यावरणविद बाबा डियोम के शब्द याद आते हैं, जिन्हें हमें सीखने और बच्चों को सिखाने की आज बेहद जरूरत है। बाबा डियोम कहते हैं:-

*"फॉर इन द एंड, वी विल कंजर्व ओनली वॉट वी लव,
वी विल लव ओनली वॉट वी अंडरस्टैंड,
वी विल अंडरस्टैंड ओनली वॉट वी आर टॉहट।"*

सच ही तो! जो हमें सिखाया जाता है, वही हम समझते हैं, जो समझते हैं उसे ही प्यार करते हैं। अंततः जिसे हम प्यार करते हैं, उसे ही बचाना चाहते हैं। पर्यावरण, पेड़ पौधों, जीव-जंतुओं, नदियों झीलों को संवारना और प्यार करना, यह बाबा डियोम का मंत्र हमें खुद भी सीखना है और बच्चों को भी सिखाना होगा, तभी वह इन्हें समझेंगे भी और प्यार भी करेंगे।

CHAPTER 22

Air Pollution: Legal Control Mechanics in Jammu and Kashmir

DR. MOHD. AYUB DAR*

JAMMU AND KASHMIR: A PANORAMIC VIEW

For the wholesomeness of its environment Jammu and Kashmir is known as a paradise on earth. The valley of Kashmir has been described as 'an oval plain girt with a chain of mountains, an emerald set in pearls, a land of lakes, clear streams, green turf, magnificent trees and mighty mountains—where the air is cool and the weather sweet, where men are strong and women vie with the soil in fruitfulness¹. Its every hundred feet of elevation brings some new phase of climate and of vegetation and in a short ride of few miles one can pass from overpowering heat to a climate delightfully cool, or can escape from wearisome wet weather to a dry and sunny atmosphere². Its air and water can restore the health of the people who are robbed of it by the Indian plains. Every year's residence in the valley discloses some new charm and new interest³.

Today, however, state stands squeezed to an area of 101387 square kilometres⁴ and has a population of 10069917 which

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continues to increase with a decadal growth rate of about 29% from 1981-2001⁵. Comprised of fourteen districts which are sub-divided into fifty nine tehsils, the state consists of sixty eight urban areas and 6652 villages with a population density of 99 persons per square kilometre⁶. Three-fourth of the population lives in rural areas and one fourth of it lives in urban areas. The literacy rate is on the increase and has gone up to 54.46% according to 2001 census in comparison to 1981 census which estimated 73% population as illiterates⁷.

Being rich in hydraulic resources, the state has immense potential for development of hydraulic power⁸. Excluding a few diesel sets and the kalakote thermal unit, the entire power is produced by the hydro-power projects and gas turbines⁹. The state as such does not and would not face air pollution problems from power generation provided, once the resource constraints are overcome, the hydraulic resources are tapped to the optimum.

Jammu and Kashmir is rich in biodiversity and is termed as a biodiversity hot spot within the Himalayan range. Its wild kinds of medicinal plants have a good potential to improve state economy. The state, however, continues to regulate its biodiversity including especially the forests and wild medicinal plants according to colonial regulatory systems like the Forest Act, 1927 and the Kuth Act, 1924¹⁰. The state has been urged to modulate its regulatory conservation efforts in accordance with the current international legal regime which can boost the international market for its largely unexplored medicinal plants¹¹.

The state of Jammu and Kashmir has only 19% forest cover which is much below 30% cover requisite to ensure ecological stability. Despite Supreme Court's wide range of directions to ban the felling of rare species of trees¹² and regulate saw mills¹³ in the state, there has been little progress to save the existing forest cover¹⁴. In view of its carbon sequestration potential, the decrease of forest density is of vital concern especially for the inhabitants of those areas which have lesser forest area but more industrial, vehicular and increasing population pressures.

The state though claimed to be at the threshold of industrialization has witnessed a substantial increase in industrial expansion at the small-scale level during last two decades¹⁵. The location of industries has hitherto largely been the choice of the

entrepreneurs who have selected it with more stress on considerations like the availability of power, labour and other services, proximity to residential areas, resources and the market. This has resulted in the intermingling of polluting industries and residential areas leading to industrial emissions adversely affecting the people, property and vegetation¹⁶. Tons of dust coughed out by some industries has been reported revolving round the heads of inhabitants of some areas making their survival miserable¹⁷. Due to too much stress on industrialization the grant of licenses has either been in utter disregard of the existing licensing laws or these laws have been so liberally construed where protection of environment has been given low or no priority.

As on 31-3-2001 there were 42808 small-scale industrial (SSI) units formally registered with the state Industries Department. No doubt all the units do not remain functional all the times but numerous incentives are being advanced to promote new or the non-functional and sick units to boost the state economy and reduce the increasing unemployment problem¹⁸. According to 1998 census out of a total of 36510 SSI units surveyed 7096 units were functional in urban areas and 8049 units were functional in rural areas. This figure does not include 743 units functional out of 1196 units in industrial estates¹⁹. True that all the functional units are not polluting, nevertheless these figures indicate that around 46.85% of the polluting industrial sources remain concentrated in 68 urban centres of the state and 53.15% in rural areas.

Industrial estates are considered a viable option and alternative with multiple advantages both to industry as well as to the society. It, above all, prevents haphazard growth of industries which complicates the monitoring efforts both of the government and the pollution prevention agencies. Although huge land is covered by industrial estates controlled by District Industries Centres, State Industrial Development Corporation and the Small Scale Industries Corporation, only 4.90% of the total units are located in such estates²⁰, with around half of the units being non-functional in such estates (see Table 22.1).

The state has not witnessed any substantial growth of medium scale industries in the state public sector. (See Table 22.2) Cement and mineral based medium scale industries form an important industry group in the state public sector which has been a cause of annoyance to the public in view of the large scale health and

Table 22.1 : Total number of Industrial Estates and SSI Units therein*

1	Controlling Agency	No. of Estates	Area in Kanals		Units Functional		Non-functional
			Jammu	Kashmir	Jammu	Kashmir	
2			Jammu	Kashmir	Jammu	Kashmir	Jammu
3	DIG	13	19	1394	201	224	76
4	SICOP	4	3	2762	280	44	81
5	SIDCO	4	7	8331	174	43	22
6	Total	21	29	12031	655	311	179
7	Total J&K	50		24265	966		781

*Source: Directorate of Industries and Commerce, Planning & Statistical Section, Government of J&K
 'A Handbook of Industrial Statistics-J&K State-2000-2001', pp. 40-42.

Table 22.2 : Medium Scale Industries in the State Public Sector*

Table 22.2 : Medium Scale Industries		Position as on					
S. Industry group	Manufacturing line	31-03-1997	31-03-1998	31-03-1999	31-03-2000	31-03-2001(P)*	
No.							
01. Drugs and chemicals	a) Rosin & Turpentine	3	341	3	330	3	238
	b) Santonian	1	23	1	24	1	21
	c) Matches	-	-	-	-	-	-
02. Leather Industries	a) Tanned Hides skins	-	-	-	-	-	-
	b) Leather products	1	21	1	22	2	726
03. Textile Industries	a) Raw Silk	2	818	2	806	1	356
	b) Silk Fabrics	1	377	1	373	1	310
	c) Woollen Fabrics	1	323	1	312	1	31
	d) Hosiery goods	1	32	1	32	1	196
	e) Raffal Yarn	2	301	1	198	1	88
	f) Shoddy yarn	-	-	1	93	1	528
04. Wood industries	a) Joinery articles/furniture	2	564	2	559	2	37
	b) Cricket bats	1	32	1	36	1	155
	c) Ply board	1	157	1	157	1	-
05. Mineral based industry	a) Cement	2	648	-	655	1	630
	b) Concrete Poles/Spun pipes etc.	2	249	NA	NA	NA	NA

Table 22.2 : Contd.

S. Industry group No.	Manufacturing line	Position as on								
		31-03-1997	31-03-1998	31-03-1999	31-03-2000	31-03-2001 (P)*				
06. Cement related products and mining activities	c) Bricks	1	65	1	82	NA	NA	NA	NA	NA
	d) Briquettes	-	-	-	-	-	-	-	-	-
	e) Coal	1	1153	1	1150	NA	NA	NA	NA	NA
	f) Lignite	-	-	-	-	-	-	-	-	-
	g) Gypsum	1	51	1	90	NA	NA	NA	NA	NA
	h) Borax	-	-	-	-	-	-	-	-	-
	i) Lime	-	-	1	41	NA	NA	NA	NA	NA
	j) Marble	-	-	1	14	NA	NA	NA	NA	NA
07. Miscellaneous	a) Handicrafts items (Arts Emporium Production Units)	3	73	22	198	NA	NA	NA	NA	NA
	Total all products	26	5554	45	5760	16	3597	27	5148	25

*Source: J&K Industries Limited, Handicrafts (S&E) Corporation; J & K Cements, J & K Minerals

Note: Borax and Marble not in operation since 1988-89.

NA: Not available; P: Provisional

biodiversity related adverse effects. In 1995 there were thirty one medium scale industries which generated employment for 5673 persons²¹ but their number has decreased to twenty six which has reduced the employment avenues as well. There are only two central public sector industries employing 787 and 206 persons respectively²². Significantly the number of factories some of whom are an important source of air pollution have registered substantial growth in the state from 1975 till 2000, and have multiplied the employment opportunities as well (Table 22.3).

Table 22.3: Registered Factories in J&K*

S. No.	Year/Industry Group	Number of Registered Factories	Total No. of Workers in Factories
1.	1952	46	5808
2.	1956	42	NA
3.	1960	139	NA
4.	1965	191	9860
5.	1968	189	9640
6.	1981	574	23888
7.	1985	720	29535
8.	1990	833	32891
9.	1991	861	33884
10.	1992	875	34280
11.	1993	875	34280
12.	1994	876	34238
13.	1995	876	34238
14.	1996	899	34855
15.	1997	899	34855
16.	1998	902	34901
17.	1999	934	35243
18.	2000		
01.	Manufacture of food grain products	185	4319
02.	Manufacture of beverages, tobacco and its product	11	678
03.	Manufacture of cotton textiles	11	2611
04.	Manufacture of wool, silk and synthetic fibre textiles	64	3711
05.	Manufacture of textiles products including wearing apparatus other than foot wear	34	1652

<i>S. No.</i>	<i>Year/Industry Group</i>	<i>Number of Registered Factories</i>	<i>Total No. of Workers in Factories</i>
06.	Manufacture of wood and wood products, furniture and fixture materials	98	2079
07.	Manufacture of paper and paper products, printing, publication and allied material	26	1077
08.	Manufacture of leather and fur products except repairs	6	247
09.	Manufacture of rubber plastic petroleum and coal products	18	446
10.	Manufacture of chemicals and chemical products except products of petroleum and coal	49	1652
11.	Manufacture of non-metallic minerals products	97	3894
12.	Base metal and allied industries	80	2185
13.	Manufacture of metal products and parts except machinery and transport equipment	60	1046
14.	Manufacture of machinery and machine tools and parts except electric machinery	33	876
15.	Manufacture of electric machinery/apparatus appliances and parts	46	925
16.	Manufacture of transport equipment and parts	8	175
17.	Other manufacturing industries	27	1837
18.	Electricity	1	380
19.	Construction	6	316
20.	Retail trade and others	8	111
21.	Storage and wear house	4	38
22.	Sanitary services	2	104
23.	Personal services	1	9
24.	Repairs services	54	4992
25.	Activities not adequately defined	5	138
26.	Crude petroleum natural gas	3	84
27.	Whole sale trade	1	6
Grand Total		938	35588

*Source: Labour Commissioner; see also Digest of Statistics, 2001, p. 202.

Despite an overall growth in the industrial sector, the number of industrial units as have sought consent from the State Pollution Control Board during past several years has remained on a low web. Although Rule 9 of the Prevention and Control of Pollution (Uniform Consent Procedure) Rules, 1999 makes it mandatory for the Pollution Control Board and the State Government to furnish the prospective unit holders information regarding restrictions notified for certain areas for regulation of siting of industries and undertaking development projects along with the consent applications and involve the State Industries Department in this behalf so that the prospective entrepreneurs seek necessary consent from the Board, it appears that the State has not so far taken effective steps to arrange a coordinative approach as envisaged under the Uniform Consent Procedure Rules. Consequently the industry in the state by and large continues to show a reluctance to seek consent from the Board (see Table 22.4). True that the State Pollution Control Board has exempted some non-obnoxious and non-hazardous industrial units which do not discharge polluting effluents/emissions²³, from seeking consent but it does not imply that the number of polluting units does not exceed the number of units shown to have sought the necessary consent from the board.

Another equally worrying source of air pollution in the state is its increasing vehicular fleet. There is gradual increase of lead concentration in different natural water systems of the state particularly the bowl shaped valley which is ascribed to emissions from automobiles, domestic wastes and anthropogenic causes including fossil fuel burning²⁴. The state has turned into a dumping ground for older vehicles from other states especially Delhi. In addition to its own vehicular fleet, each day hundreds of heavy vehicles with inter-state permits enter the state covering hundreds of miles both in the plains and hills to reach their commercial destinations, spewing out noxious pollutants into the open air. Equally alarming are the noxious emissions of the vehicular fleet belonging to the security forces which have been deployed to the state as part of the security arrangement which are neither registered in the state nor is their actual number accounted for. What is of immediate concern is that emissions from such vehicles are not properly regulated by the traffic authorities for multifarious reasons.

Table 22.4 : Total Consents Granted by J&K State Pollution Control Board

Period	Fresh Consents		Renewal of Consents		Total
	To Operate	To Establish	To Operate	To Establish	
22-07-1998 to 31-03-1999	64	37	35	35	171
01-04-1999 to 31-03-2000	74	32	40	72	218
01-04-2000 to 31-03-2001	98	21	56	137	312
01-04-2001 to 31-04-2002	60	14	58	115	247
01-04-2002 to 18-07-2002	24	01	12	12	49

Source : Consent Register of J&K State Pollution Control Board for the years 1998-1999, 1999-2000, 2000-2001, 2001-2002 and 2002-2003. The total consents granted are composite under the Water Act, 1974 and the Air Act, 1981.

Noise is no less damaging pollutant than the toxic chemicals. In Jammu and Kashmir, in addition to stationary industrial sources of noise, community noise, which is not area specific, occurs due to various activities like festivals, religious functions, processions and social activities like marriages. This type of noise pollution can occur anywhere any time. Likewise temporary traffic noise is affecting larger number of people especially in cities and towns and is rapidly increasing. A study by the State Pollution Control Board has shown the noise levels exceeding beyond permissible limits especially in silence zones and commercial areas of the cities of Jammu and Srinagar²⁵. Due to frequent power cuts there is an increasing use of diesel generator sets²⁶, using fuels like kerosene, diesel and petrol to generate electricity. The generator sets while in use spew out noxious emissions like vehicles and make huge noise especially in the busy commercial areas of cities and some towns. Despite implementation of the Noise Pollution (Regulation and Control) Rules, 2000 and the adoption of guidelines by the State Board for the use of D.G. sets²⁷, little attention is paid towards the dangerous emissions resulting from their operation without necessary fittings of pollution control devices.

Obviously, therefore, such an increasing environmental degradation can no longer be swept under the carpet on the ground of industrial backwardness nor can an unbridled industrial expansion harvest any good for the paradise except putting lead and other toxic emissions into the heads of its inhabitants. Strict implementation of the laws by the regulatory agencies with a simultaneous mass awareness campaign about the ill effects of the current environmental degradation is the safest option to curtail the existing pace of pollution.

LEGAL CONTROL MECHANICS IN J&K: A LEGISLATIVE JOURNEY

Preservation of the natural environment of the State of Jammu and Kashmir appears to have been an issue of some concern to some of its rulers in the past.²⁸ But from the past so many decades we have been ignoring the heavenly status of this finest part of the earth. Although Part III of the Constitution of India is directly applicable to the State of Jammu and Kashmir²⁹ the Constitution of the State has almost observed silence in the protection of environment. Barring provisions in the Directive Principles

commanding the State to safeguard and promote the health of the people by advancing public hygiene and by prevention of disease through sanitation etc³⁰ the State Constitution instead stresses upon the materialistic quest³¹. Of late the state legislature seems to have viewed the protection of the environment seriously. Besides some specific legislative attempts undertaken with a view to protect the environment, some social welfare authorities under recent laws have been entrusted with the authority to take necessary steps by way of social justice litigation with regard to protection of the environment³². The following brief account of the state of legal environment with respect to the medium of air depicts the rising social concerns in the state of Jammu and Kashmir towards the protection of the heavenly environment.

The Rambir Penal Code and some Licensing laws

Apart from the Procedural laws³³ of the State, the Rambir Penal code of 1932 provides that whoever vitiates the atmosphere so as to make it noxious to the health of the persons in general dwelling or carrying on business in the neighbourhood or passing along a public way shall be punished with fine³⁴. Negligent conduct with respect to poisonous and explosive substances, fire or combustible matter is also made punishable by the Code³⁵. In order to regulate the manufacture, possession, use, sale, transport and import of poisons, explosives, combustible matter and other dangerous substances the State had a plethora of self enacted statutes which have been replaced by the Central analogous Acts from time to time³⁶, though in certain cases for limited purposes only. These Acts provide procedures for the grant of licenses in order to regulate the possession of such substances in the State besides making provisions for their safe custody. Various conditions can be imposed in the licenses determining the places and the manner in which the substances may be stored and packed. The vessels containing dangerous petroleum which is imported, transported, sold or exposed to sale shall contain labels stating therein the description of the petroleum, the name of the owner or consignee and the words 'highly inflammable'³⁷. Any contravention is made punishable besides confiscation of the substance.

The Jammu and Kashmir Boilers Act, 1934

Matters connected with the use and possession of boilers, both governmental and private, are regulated under the Boilers Act, 1934³⁸. The Act provides for the registration and regular inspection of the boilers, their maximum pressure and the method of determining such pressure, the qualifications of persons in charge of boilers and the grant of certificates of fitness in respect of all boilers in the State³⁹. The enforcement machinery comprising of Chief Inspector and Inspectors can prosecute a person for use of unregistered, uncertified or unfit boilers or at a pressure higher than the maximum; for making structural alterations of the boiler or tampering with its safety valve or for failure to report boiler accidents⁴⁰. However, an amount of five hundred rupees as penalty for such grave acts is too meagre to guarantee against the environmental risks involved. Court cannot punish polluters even with such paltry sums where complaints are without the previous sanction of Chief Inspector or are filed after six months from the date of commission of offences⁴¹. Where the authorities fail or deliberately omit to prosecute, a private individual cannot step in to prosecute the offender.

Factories Act, 1948

The operation of the Central Factories Act, 1948 has been extended to the State of Jammu and Kashmir from December 1970 by replacing its own labour laws including the State Factories Act, 1957.⁴² Like the State Factories Act, 1957 the Central Act provides for the registration of factories in the State, their licensing, regulation and control of dangerous, explosive, inflammable dusts and fumes and artificial humidification. Though Section 14 of the Act shows more concern about the indoor air pollution in a factory, under Section 37 if any manufacturing process in a factory results in production of dust, gas or fume to such an extent as is likely to explode on ignition, all practicable means shall be taken to prevent any such explosion and to restrict the spread and effects thereof.

Strangely, the implementation of the Act is made dependent on the whims and fancies of the officials and neither a worker nor a private individual stands on a better footing if emission levels cross the prescribed limits. The Swedish law and the Clean Air

Act of United States allow workers to strike work on an apprehension of excessive emission and the management cannot discharge or discriminate any worker for raising such an issue.⁴³

Industries (Development and Regulation) Act, 1951

The Industries (Development and Regulation) Act, 1951⁴⁴ provides for the control of certain specified industries by the Union of India through their development, regulation and licensing. The Act makes no direct reference to environment but the planning of future development on sound and balanced lines is sought to be attained by the licensing of all new undertakings by the Central Government. The industries being the chief polluters the imposing conditions for the issuance of licenses under Section 11(2), particularly those relating to their location, can be utilized to serve the cause of environment. Besides section 15 of the Act, empowering the Central Government to order investigation against the industries which manage their affairs in a manner highly detrimental to the public interest, is a fine tool to curb environmental degradation by large industrial undertakings.

Mining Laws

Mining operations cause air pollution by addition of either toxic gases generated by blasting and drilling into the atmosphere or by the emission of dust particulates and other toxic chemicals. In addition the transportation of materials in mines and processing units of minerals add pollutants to the surrounding air which remain in the local atmosphere for a considerable period, causing thereby an unhealthy working environment. In Jammu and Kashmir all mines of metal and coal, quarries and all earth oil and gold washings even if found in private land are the property of the State Government which possesses all powers for their 'proper enjoyment'⁴⁵. Some of the mining activities of the State have been declared unplanned and without adequate safety measures.⁴⁶ However, it is the duty of the Central Government to take necessary steps for the conservation and systematic development of minerals in India and for the protection of environment by prevention and control of pollution which may be caused by prospecting or mining operations and to achieve the object it may through rules prohibit polluting activities in mining and provide

for the disposal or discharge of waste slime or tailings arising from any mining or metallurgical operations carried out in a mine.⁴⁷ But where activities of mining, quarrying, excavating, blasting or other similar operations in an area result in atmospheric pollution with ultimate tendencies to injure, deface or imperil any protected monument in the State, it is the State Government which is through rules and terms of licenses to restrict such activities.⁴⁸

Municipal Act, 2008 (1951 A.D.)

The Act contains certain unique provisions which empower the municipal authorities to deal effectively with nuisances that often result in the pollution of air. Certain trades and manufactories⁴⁹ which are inherently dangerous or offensive or cause unwholesome smells, gases, noises or smoke can be permitted in a municipal area only under a license which is to be renewed every year. Contravention of the relevant provision of the Act or a condition in a license issued thereunder is however punishable with a meagre amount of fine.⁵⁰ Registered or licensed trading activities which cause nuisance to neighbourhood or are likely to be dangerous to life, health or property can be directed to be discontinued or in the alternative the licensee can be required to effect such alternations, additions or improvements as will render an activity no longer nuisance or dangerous.⁵¹ Emission of offensive noise by use of whistle, trumpet or any other mechanical contrivance or by the exhaust pipe of any engine in a factory is prohibited and made punishable where it is with written permission of the Executive Officer of the Municipality who is authorized to impose proper conditions restricting the times at which such whistle or trumpet etc. may be used.⁵²

The Act contains adequate provisions to prohibit stacking or collection of inflammable materials, discharge of fire-arms or letting-off fire works, fire balloons or detonators, quarrying or blasting, slaughtering of animals at places other than those fixed by the municipal authorities, disposal of the carcass of dead animals, sewage, rubbish or offensive matters of any kind that frequently result in pollution of surrounding atmosphere by spread of noxious smells.⁵³ The Act also mandates a Municipal Council to adopt adequate measures for scavenging and house scavenging and roofs or external walls cannot be made of grass-mats, leaves or other highly inflammable materials in municipal areas.⁵⁴

State Anti Smoking Laws

Despite pressing demands to control smoking in public places and the consequent recent legal prohibitions in this behalf, the needs of the exchequer have reduced even the legend of statutory warnings on cigarette packets and advertisements to a mere mockery.⁵⁵ The worrying aspect of it is that 22.68% of smoke from smoking cigarettes containing higher concentration of noxious compounds goes directly into the environment⁵⁶. In addition to recent Government order banning smoking in public place, there are four anti-smoking legislations in force in the State. The Juvenile Smoking Act, 1986 Samvat (1929 A.D.) aims at preventing smoking by youthful persons by making the offence summarily triable before a magistrate⁵⁷. The Act also gives powers to certain respectable persons to seize and destroy tobacco where any boy is found smoking or chewing it or taking it as snuff.⁵⁸ The Jammu and Kashmir State Prohibition of Smoking (Cinema and Theatre Halls) Act, 2009 (Samvat) (1952 A.D.) has a limited scope to prevent indoor smoking in cinemas and theatre halls during prohibited periods⁵⁹. Due to the weak implementing machinery, poor prosecution strategy and paltry prescription of fines these Acts have remained only dead letters on the Statute book but the heavy punishment provided under the Opium Smoking Act, 2001 (Samvat) (1954 A.D.) has considerably helped to control the menace of smoking opium in the State⁶⁰. The Jammu and Kashmir Prohibition of Smoking and Non-Smokers Health Protection in Public Service Vehicles Act, 1997 prohibits smoking in public service vehicles. The Act also prohibits such advertisements in public service vehicles which may directly or indirectly promote smoking or the sale of cigarettes and beedies etc. Any person committing the offence of smoking in a public service vehicle is punishable with a fine up to one hundred rupees and in case of second or subsequent offence the quantum of fine may range from rupees two hundred to five hundred. Similarly persons promoting smoking through advertisements in public service vehicles are punishable with a fine which may extend to five hundred rupees for the first offence and a minimum of five hundred to a maximum of one thousand rupees for the second or subsequent offence. The offences under the Act are to be tried summarily in the court of Judicial Magistrate First Class on a complaint of an authorized officer or a report in writing of a police officer. Offences are

compoundable both before and after the institution of the proceedings in the court.

Jammu and Kashmir Fire Force Act, 1967

To prevent air pollution occasionally caused by fires, accidental or otherwise, the Jammu and Kashmir Fire Force Act, 1967 creates a separate Force in the State and invests the State Government with powers to reward persons who give timely notice of fire or render effective service to the Force on occasions of fire⁶¹. The Act authorizes the Force to require owners of any premises or objects to take adequate precautionary measures or to remove the goods to a place of safety if they are likely to cause a risk of fire⁶². The Act also prescribes a minimum amount of punishment for certain acts and omissions⁶³.

Brick Kiln (Construction) Rules, 1912 and Siting Criteria, 1990

A brick kiln in the State can be set up only after a license is granted by the Tehsildar of an area. Rule 5 of the Construction of Brick Kiln and Preparation of Surkhi lime and Plaster of Paris (Kashmir Province) Rules, 1969 Samvat (1912 A.D.)⁶⁴ provides that a brick kiln should be constructed at a distance of four hundred fifty feet from abad-deh (residential area of a village) so that bad smell may not spread in the village and cause injury to the health of the villagers. The areas for the construction of such kilns are to be specified out side municipal and town area limits⁶⁵.

A similar distance for construction of brick Kilns is required to be maintained for Jammu province under a different set of Rules⁶⁶. A contravention of the Rules or breach of a duty imposed therein including maintenance of the distance while constructing a brick Kiln is punishable by a Tehsildar with fine up to Rupees twenty five in Kashmir province or imprisonment up to one week or fine up to Rupees fifty in Jammu province.⁶⁷

The above sets of Rules have been framed not with the object of prevention and control of air pollution but to avoid air emissions from the brick Kilns affecting the health of the adjacent villagers. Where one or more Kilns are set up beyond four hundred fifty feet from a village but nevertheless the smoke emission there from affects the human health of villagers living at such distance, it will

not amount to a contravention of the Rules and will not be consequently punishable. The rules look to brick Kilns more with a revenue eye than from an environmental angle and have no regard to the harmful effects of kiln pollution upon the topography, vegetation including crops and plants in the immediate vicinity of a brick Kiln. Brick by brick a Kiln may destroy the entire land of the adjacent area simply by paying a few rupees per annum as token royalty to the State exchequer which is only a small fragment of the cost reclamation of the Land.⁶⁸ The users of land ought to have been charged a rate of royalty that realistically reflects the cost of reclamation in future.

Manufacture of bricks requires huge human labour and as a result of brick industrialization in an area the workers, the suppliers of raw material, the ultimate consumers of the product are all attracted to the area resulting in huge pollution and insanitation problems; countless heavy vehicles used for transporting men, material and product move the brick waste and dust from Kilns which is seen flying behind such vehicles miles away from a brick industry affecting human health and all around especially the greenery and agricultural crops round the roads. Much of the pollution problem from brick kilns could be solved by adequate provision in the Rules providing for regular cleaning and wetting of the roads and even the ground within or around the kiln premises, by growing of a green belt along the periphery, proper storage and utilization of brick waste which is at times carried away by winds in broad day light into adjacent villages. Even the stagnant water stored and accumulated unhygienic by Kiln owners for use for manufacturing of bricks becomes a fertile source and breeding place for so many insects, moss and mosquitoes adding to the volume of insanitation in the area. Section 3(3) of the Village Sanitation Act, 1933⁶⁹ could be utilized for defining and prohibiting such public nuisance in or near any village but a District Magistrate is handicapped by the Act to move in the direction *suo moto* as he can order a local enquiry in this behalf only in a village which the Government may specify in its direction. The Act, in fact designs an impure policy of village sanitation by placing the sanitation switch remotely in the hands of the Government instead of a District Magistrate.

During 1990-91 the State Board for the Prevention and Control of Pollution adopted new criteria for siting of small-scale

brick kilns, lime kilns and coal briquetting units which was to be strictly followed by all industrial licensing agencies. Significantly a new Draft Siting Criteria has been put to implementation from 1999 without an express repeal of the Siting Criteria issued in 1990. Even if it is assumed that some aspects of the older criteria, in view of their inconsistency, must give way to the new ones, there are some aspects which have not been touched in the new criteria and which will therefore continue to be binding on the industry until there is an express repeal by the Board of those aspects of the criteria. According to this criteria such units should be at least 1 km. away from another unit and should not be established on prime agricultural and forest lands, Besides fulfilling these two conditions such units must be

at least $\frac{1}{2}$ km. away from Railway Lines, State and National Highway, high Tide lines, flood, plains, villages and small settlement; 2 kms. away from the outskirts of small towns of population 50000 or less and 5 kms. away from the outskirts of large towns of population more than 50000.⁷⁰

The criterion is no doubt an improvement over the Brick Kiln Rules but is far from being satisfactory *inter alia* on the following grounds:

1. Ironically Villages and small settlements have been grouped with railway lines and Highways. While railway lines and highways may remain in a stagnant position for decades together, because of the rural sprawl and growth in residential houses around a village, small settlements cannot be expected to remain in a stagnant position for or within even a decade. The spatial direction of growth of the villages and small settlements for at least a decade must be assessed and the industry need to be sited accordingly much away from the project growth boundary of the settlement. Such a siting criteria will also be in tune with the concept of intergenerational equity.
2. Inhabitants of villages and small settlements have as much a right to clean and healthy environment as shall be available to those living in small or large towns. Even if a town is with a population of 20,000 a differential siting criteria for such a town stands without justification when compared to two or three villages located adjacently to each other whose total

population may exceed 20,000 and nevertheless have not been declared a town by the State. In such cases the criteria amounts to a discrimination on the basis of residence and is violation of the constitutional principle of equality.

3. It is desirable to establish industrial zones far away from human settlements rather than requiring an industrial unit to be located at least one km. away from another such unit. Establishment of such zones would make the job of pollution monitoring easier, less expensive and more impartial.
4. While the Board appears to be serious to prevent installation of polluting industries against the prescribed norms, it has no clear cut policy for relocation of already installed units where relocation is the only way out to prevent pollution. The criteria is therefore incomplete and a half-hearted attempt which may instigate new entrepreneurs to manage evasion of environmental laws rather than to cooperate to conform to them.
5. The criteria prohibit the location of some industrial units on prime agricultural and forest lands, but do not prohibit their location close or adjacent to such lands. With the object to save agricultural crops and forests the criteria in practice intends to save small bits of agricultural and forest land that may occur beneath the kiln and not the agricultural or forest land around or their crops. In the absence of a specific distance needed to be maintained for location of such industrial units from such lands, the criterion appears to be an exercise in futility. Besides, the criteria are silent about the importance of ecologically or otherwise sensitive areas whose identification should receive utmost priority in every siting directive of the Board. Protection of environment does not merely aim at protection of human health but also protection of environment as widely defined today.⁷¹

The Industries Act, 1961

The subject of air pollution receives a secondary importance in some other enactments developing or regulating trade and industrial activities in the State. The State aid to Industries Act, 1961 constituting the Board of Industries in the State facilities State assistance to entrepreneurs in utter disregard of the advice, if any tendered by the State Pollution Control Board as no industry need to prove itself eco-friendly before assistance is granted. Consequently the Pollution Prevention Authorities have no effective say in the

decisions of the Board of Industries⁷². In addition licenses or permissions may be granted under Water Mills Act, 1932, Press and Publication Act, 1932 and Registration of Tourist Trade Act, 1962, without imposition of conditions for preserving clean air and atmosphere around because their provisions maintain complete silence in this behalf.

The Wild Life Protection (Amendment) Act, 2002

With a view to safeguard the environment in the protected areas from pollution the Amendment Act, 2002 has inserted inter alia a new provision viz. section 51-A in the Wild Life (Protection) Act, 1978. The Amendment Act makes it an offence to set fire to a protected area or kindle or leave any fire burning in such manner as to endanger such protected area⁷³. Likewise it is an offence to install or establish a saw mill or forest based industry or any other industry polluting the environment within such limits outside the protected area to be prescribed by the Government from time to time⁷⁴.

Regulation of Vehicular Pollution

The Jammu and Kashmir Motor Vehicles Rules 1972⁷⁵ framed by the State Government under the Motor Vehicles Act, 1939 (IV of 1939) contained rules regulating construction and maintenance of vehicles so as not to cause noise or emission of smoke, vapour or grease when in motion⁷⁶. The Rules prohibited plying of motor vehicles on any public place with smoke density exceeding 65 Hat ridge smoke units (measured by free acceleration method) in the urban areas and 70 Hat ridge smoke units in non-urban areas⁷⁷. A grace period of three years was given to the then existing vehicles to comply with the smoke emission standards. Use of loud sounding devices at stands to attract passengers was prohibited⁷⁸. The Government has repealed the Rules of 1972 and replaced them by the Jammu and Kashmir Motor Vehicles Rules, 1991⁷⁹ framed by it under the Motor vehicles Act, 1988 (Central Act 59 of 1988). The new Rules contain provision relating to prohibitions on smoking in public service vehicles⁸⁰ and use of mutational horn or devices giving unduly harsh, shrill, loud or alarming noise⁸¹ but have abandoned the earlier scheme against excessive smoke density by motor vehicles. In 1991 the State Government issued SRO 353⁸² whereby it authorized various authorities from Director General of Police to an Assistant Sub-

Inspector of Police (Traffic) to compound various offences relating to traffic including those relating to emission norms dealt under the Motor Vehicles Act. The amount of composition, under the notification can in no case be less than fifty percent of the maximum fine provided for the offences in the Motor Vehicles Act, 1989⁸³. However the authorities do not use the technique of composition of pollution offence in respect of emission standard violations.

To control the revolutionary pollution scenario from automobiles the state Government is empowered now to issue, in consultation with the State Pollution Control Board, such instructions to the State authorities in charge of Transport as are necessary to ensure compliance with the standards for emission of air pollutants from automobiles⁸⁴. The Board has no doubt adopted and notified smoke emissions standards for petrol and diesel driven vehicles in the past but due to inaction of the state as well as the traffic authorities the regulatory measures have failed to control the menace so much so that it has been reported that even the incidences of various diseases related to automobile pollution have also come to limelight in the state particularly in Jammu province. In 1999 the State Transport Department, with a view to ensure that the vehicles conform to the prescribed levels of emissions of smoke and other pollutants, has authorized the Boards of Inspectors of the Motor Vehicles Department to verify emission levels of pollutants on spot while granting certificates of fitness and utilize in this behalf the services of agencies which have sophisticated and advanced technique available and which can provide a patented pollution control device to the vehicle owners so that they do not feel any inconvenience⁸⁵. The traffic authorities avoid on spot pollution checking of vehicles because it is not adequately equipped with pollution checking equipments. Six Diesel Smoke meters and three Petrol Smoke meters available with the Traffic Department can hardly cover the entire state. Besides, vehicle owners whose vehicles prove as not complying with the emission norms on such checking are to be given a seven day's time to rectify the defect which procedure is regarded as cumbersome and time consuming, though failure to rectify within the stipulated period attracts penal provisions of section 190(2) of the Motor Vehicles Act. The Traffic authorities no doubt occasionally challan vehicle owners for driving vehicles without

'Pollution Under Control Certificates' but such challans constitute only a small fraction of the entire challans made for various traffic offences cumulatively (see Table 22.5). The fact that the state realizes huge fines from traffic violations is an eye opener for undertaking regulation of vehicular pollution in a serious manner. The Pollution Under Control Certificates are issued by the authorized agencies even without seeing and checking the vehicles. There is no foolproof system for verifying the correctness of the certificates issued by the agencies nor are they required to submit periodic statements regarding certificates issued to the concerned higher authorities in the Department of Traffic. The authorized agencies have their self-designed booklets which they can print and provide at random without any restriction as to their number as well as their genuineness. To defeat such violations it is desirable to introduce the technology facilitating computerized photographic pollution under control certificates in which emission levels are recorded without human intervention with photograph of the vehicle registration number. Till such arrangements are made certificate booklets should be provided to the agencies by the Traffic Department itself and the agencies issuing certificates should also be required to submit periodic statement to the Traffic authorities. Where certificates are found not to be genuinely issued, the issuing agency concerned shall be debarred from issuing such certificates for some time.

Table 22.5 : Total number of Challans made for non-production of Pollution under Control Certificates in J&K*

<i>Year</i>	<i>Total Challans</i>	<i>Total Fine Realized (in rupees)</i>	<i>Total Challans for non- production of PUC</i>
1999	1, 92,376	2, 53, 34,749	5506
2000	1, 85,082	2, 45, 47,325	7612
2001	1, 75,032	2, 40, 22,085	7550
2002	2, 03,860	2, 71, 35,000	6454

*Source: Based on information supplied by Shri Bashir Ahmad, Senior Prosecuting Officer Traffic Court Srinagar, Kashmir.

(C) Modern Control Mechanics in J&K

The state of Jammu and Kashmir was a party to the resolution which led to the enactment of the Water (Prevention and Control

of Pollution) Act, 1974 in the Parliament of India⁸⁶. After the coming into force of the said Act in the state⁸⁷, the Jammu and Kashmir State Board for Prevention and Control of Water Pollution initially constituted in 1986⁸⁸ was given ex-post facto sanction from September 1986 by the state Government⁸⁹.

Boards for the prevention and control of water pollution established in different states and at the centre under the Water Act, 1974 are constituted or deemed as boards for the prevention and control of air pollution under the Air Act⁹⁰. The J&K State Board for Prevention and Control of water pollution has been renamed as J&K State Pollution Control Board to facilitate a harmonious and simultaneous exercise of air pollution control powers by the Board under the Air Act, 1981. Like the U.S Clean Air Act⁹¹ the Indian Air Act envisages a policy whereby each state shall have the primary responsibility for assuring air quality within the entire geographic area comprising such state. To achieve the above objective the J&K State Pollution Control Board (J&K SPCB) is not only empowered to advise the State Government on matters concerning prevention and control of air pollution but is also to plan and execute a comprehensive programme in this behalf with due regard to the standards, for the quality of air, laid down by the CPCB⁹². One of the reasons for the Air Act placing bulk of prescription and enforcement authority in the states is that the state is the smallest established political unit whose boundaries comprehend those of the regional problem. Possessing significant resources, the state is in the best position to prescribe technologically sound standards for each air quality region within its borders and to deal responsibly with the central legislative scheme in its review of the standards. Additionally, the legislation envisages that lines of cooperation be drawn between the local authorities whose boundaries, taken together, coincide with those of the air quality region. However neither of these aspects of the law forms significant part of the air pollution prevention programme operated by the state through its State Pollution Control Board.

An air pollutant has been defined under the Act as 'any solid, liquid or gaseous substance including noise, present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment'⁹³. Inclusion of noise in the definition is

a notable feature of the new legislation to attack the problem in an extensive way.

The Act authorises the state government to declare 'air pollution control areas' in consultation with the State Board and no person can install or operate any industrial plant in such declared areas without the previous consent of the Board⁹⁴. Emission of air pollutants from industrial plants in excess of the Board's prescribed standards is prohibited in an air pollution control area and to prevent such emission in such areas the Board may make an application to a judicial Magistrate 1st class for a restraint order against the concerned industry⁹⁵. Irrespective of whether an area is an air pollution control area or otherwise, if any emission of air pollution occurs or is apprehended to occur in any premises in excess of the prescribed standards, the person in charge of the premises is bound to intimate the fact to the State Board or its prescribed agencies under section 23 of the Air Act, 1981. Failure to intimate the Board is punishable under section 38(e) with imprisonment upto 3 months or fine upto ten thousand rupees or both. Where an excessive emission occurs or is apprehended to occur in areas other than air pollution control areas, the Board can not obtain restraint orders under section 22-A from the court but has to wait till the excessive emission occurs and get the offender punished. It is submitted that in such areas the whole policy of prevention and control of air pollution is reduced to a programme of penalty and litigation. The Board is to play only a fireman role, waiting for pollution emission and only then moving in. In such situations the provisions such as section 22-A of the Air Act might be of much use and capable of achieving the purposes of the enactment more effectively than the penal provisions.

Establishment of an air polluting industrial plant in an air 'pollution control area' without the previous consent of the Board is an offence punishable with imprisonment under the Air Act, 1981 which may extend from one and a half year to six years⁹⁶. But if such a plant is established in any area other than the above, the act of establishing the plant without the consent of the Board does not amount to an offence nor need the person concerned to apply for the consent in the absence of a specific direction to such a person which the Board may issue in writing under Section 30-A of the Act. Where however a location restriction for an

industry is issued under the Environment Act, 1986 and the Rules thereunder (Section 3(2) (v) and Rule 5) and the plant is established in contravention thereof, the person will be committing an offence under the Environment Act, 1986 in the absence of a specific direction under Section 31-A of the Air Act, 1981. The punishment prescribed under Section 15 of the Environment Act, 1986 for such a type of contravention is imprisonment and/or fine which may extend to five years or one lakh rupees or both. But in order to punish the offender under the Environment Act, 1986 it is essentially to be seen that the offender is not punishable under any other Act⁹⁷. Considering the effect of the above penal policy along with the Brick Kiln Construction (Kashmir Province) Rules of 1912 if a brick Kiln is established in contravention of the Rules⁹⁸ in an area which is not declared as an air pollution control area and there is no specific directive to the concerned entrepreneur issued under Section 31-A of the Air Act, 1981, he commits an offence by violating the Siting Rule of the Brick Kiln (Construction) Rules, 1912 and the Siting directive⁹⁹ under the Environment (Protection) Act 1986 but nevertheless would be punishable with a paltry amount of Rs. 25 under the former law by operation of section 24(2) of the later Act.

Noise pollution falls within the ambit of Environment Act, 1986 as well as the Air Act, 1981¹⁰⁰. The Central Government has however specified Ambient Air Quality Standards in respect of noise under the Environment Protection Rules, 1986¹⁰¹. A noise polluter is therefore punishable under the provisions of the Environment Act, 1986 and not under the Air Act, 1981. Under Section 15 of the Environment Act, 1986 such a polluter is punishable with imprisonment upto five years or with fine upto one lakh or both provided his offence is not punishable under any other Act. In areas of the state where the J&K Instruments (Control of Noises) Act, 1959 is in force, the polluter is liable to the quantum of punishment provided under the said Act viz. imprisonment which may extend to six months or fine upto one thousand rupees or both¹⁰². In this way section 24 of the Environment Act does not only obliterate the penal and prosecutorial scheme of the Act but also reduces the Act to a toothless fastened tiger with even its claws pulled out.

In areas where the Instruments (Control of Noises) Act, 1959 is not in force¹⁰³, Section 24 tells a totally different story of penal

jurisprudence. In such areas a noise polluter is punishable under Section 15 of the Environment Act where a higher quantum of punishment may be awarded to him even though the gravity of his offence is same or less than the offenders punishable under the Instruments (Control of Noises) Act, 1959. This scheme of treating similar noise polluters differently or unequally in the award of punishment is bound to rebound with hatred and discontent. Not only this, it is also fatal to the scheme of the Air Act, 1981 which aims to create uniformity in planning and causing to execute a nationwide programme for prevention and control of air pollution¹⁰⁴ and also offends the constitutional right of equals to be treated and protected equally. The Environment Act, 1986 sings similar tunes of failure when one considers the effect of its penal scheme under the State Boilers Act, 1934. For example, where the authorities under the State Boilers Act, 1934 prescribe a standard of pressure for use of boiler which is higher than that prescribed under the Environment Act, 1986, use of boiler at such higher pressure will be an offence under the later Act created by the authorities under the former Act and severely punishable under the Environment Act but where the pressure limits cross the standards fixed under both the above Acts, by operation of Section 24(2) of the Environment Act, 1986 the user of the boiler will be liable to a meagre penalty of Rs. 500 under Section 23 of the Boilers Act, 1934, which means that to reduce penalty the user is to increase pollution.

Section 15 of the Environment Act provides for the enhancement of penalty for repeated non-compliance and the polluter is made liable to a fine of rupees five thousand for each day of contravention after conviction or to imprisonment upto seven years if the contravention continues for one year after first conviction. But this penal scheme is altogether dashed by Section 24(2) in the above situations since punishment of such continued offences after conviction is as much barred as in the cases before first conviction. Consequently, a polluter in the above situations will be liable to the same quantum of penalty for continued offences after first conviction as provided under the local Act under which he is first convicted. Besides the procedure for prosecution provided under the local statutes is less technical and less cumbersome in comparison to the Air Act, 1981 and the Environment Act 1986.

The provisions of the Air Act and the Environment Act have adopted a laudable policy to punish even the Government Departments through their officers for committing an environmental offence¹⁰⁵, but unless those provisions are interpreted to include the pollution control boards and their officers, the scheme envisaged would be like a mirror that always looks around to reflect surroundings and never itself. While great care has been taken under the legislations to punish the polluter and invest the pollution control boards and their officers with maximum monopoly of power in the prevention and control of pollution, no provision ensures bona fide exercise of such power by the boards through their officers. Such bona fide exercise of power cannot be taken far granted especially in the circumstances when lapses in this behalf of some Pollution Control Boards have come to limelight¹⁰⁶.

Even in the presence of above interpretation if an environmental offence is committed with the consent or connivance of the Board or any of its officers and the offence falls under the Environment Act, 1986 and not the Air Act 1981, Section 24(2) of the Environment Act has the effect of facilitating a paltry award of punishment for such officer under the ordinary criminal law of the state¹⁰⁷ since such act or omission amounts to an offence by public servant. The fact however remains that such official omissions or commissions are no less heinous than the offence by the actual polluter and may even invite and encourage greater environmental degradation. Thus to deter such officers and curb their tendencies to misuse the power it is desirable that they be punishable with the same quantum of punishment as provided under the Environment Act. Section 43 of the Air Act and section 19 of the Environment Act complicate the prosecution of a defaulting officer of the Pollution Control Board as no court under these provisions can take cognizance of his offence except on a complaint by the Board or by any of its officers authorized in this behalf. This results in the merger of the accused and the complainant which tends to produce a sense of partiality by making the board the prosecutor as well as the accused. No doubt a private individual is also invested with a right to file such a complaint but he is required to give sixty day's prior notice to the board in this behalf to give time to the Board to file such complaint. Ordinarily due to involved technicalities and the secrecy maintained by the Board in regard to its environmental transactions, defaults by its officers

may remain hidden or beyond the comprehension and knowledge of a private individual and even in cases where a private individual gets knowledge about the default of the officer, the Board may during sixty day's notice period (if at all served) itself file a defective complaint to save the concerned officer from the prosecutorial clutches.

J&K Air (Prevention and Control of Pollution) Rules 1987

To carry out the purposes of the legislation, Section 54 of the Air Act, 1981 confers power upon the state Government to frame rules, by notification in the official Gazette; the State Government can not however make rules in respect of matters reserved for the Central Government¹⁰⁸, nor can it amend, repeal or vary a rule once made by it without consulting the State Board¹⁰⁹. The Government of Jammu and Kashmir framed the Air (Prevention and Control of Pollution) Rules, 1987 which have come into force from the date of their publication¹¹⁰. The rules appear to be a replica of the Air (Prevention and Control of Pollution) (Union Territories) Rules, 1983¹¹¹. Numerous drafting defects are apparent, furnishing lawyers fertile grounds of challenging the rules. While an 'appellant' has been defined as one "aggrieved by an order made by the CPCB under sections 20, 21 and 22 of the Act, 'Appellate Authority' under the rules means 'the Appellate Authority constituted by the Union Territory under sub-section (1) of section 31'¹¹². The rules make mention about various 'Forms appended'¹¹³ but no such forms have been appended with the rules or notified later, except Form I in respect of 'application for consent' under the Act which alone has been appended to the Rules¹¹⁴.

Section 19 (1) of the Act authorizes the State Government to prescribe the manner for declaration of an area as an 'air pollution control area'. Instead of prescribing the said manner Rule 8(1) in anticipation declares "the area bounded by the respective boundaries of the industries specified in the Schedule appended to the Air (Prevention and Control of Pollution) Act, 1981 (XIV of 1981) as air pollution control areas under section 19(1) of the Act.¹¹⁵ The Schedule referred to in the Rule was omitted by the Air (Amendment) Act of 1987 from the year 1988 itself 415. The declaration raises serious doubts about its efficacy

during the period of its operation (viz. from 1987 to 5th January 1999) especially when courts in other parts of India have declared similar declarations void for their failure to meet the statutory requirements. A subsequent SRO issued in 1999 wherein the State Government, in consultation with the State Board, has declared the whole of the state as air pollution control area¹¹⁶, seems to have remedied the defect though only prospectively.

The state Air Rules, 1987 prescribe the procedural aspects in respect of various matters concerning consent applications, the manner of taking samples of emissions, the authorities to whom information required under the Act is to be supplied, the report of analysts, functions of State Air Laboratory, the manner of filing of appeals and the procedure to be adopted by the Appellate Authority¹¹⁷. Rule 22 provides an incurable continuing defect by providing for the functions to be performed by the Board 'under clause 4 of sub-section (2) of section 17' of the Air Act Sub-section (2) of section 17 of the Air Act 1981 however deals with the power of the State Board to establish or recognize laboratories and has no clause in it. Additionally Rule 22 strangely provides that the State Board "will perform such functions as may be specified by the Central Board, in consultation with the administration set up under the Water (Prevention and Control of Pollution) Act, 1974, in writing from time to time". Some of the matters which are significant for an efficient exercise of powers under the Act and in respect of which Rule making power has been conferred, but not exercised by the State Government under section 54, have been dealt under the Jammu and Kashmir Water (Prevention and Control of Pollution) Rules, 1987¹¹⁸. Rule 2 (m) of the J&K Air Rules, 1987 commits another grave error while supplying the above deficiency. It provides that the Rules made by the Central Government under section 53 of the Act 'will be treated as deemed to have been made under various clauses of sub-section (2) of section 54 wherever such Rules are applicable and have not been included in these Rules.' It is pertinent to mention that the said Rules¹¹⁹ framed by the Central Government in consultation with CPCB under section 53 of the Act have no relevance to the State Board but deal with matters exclusively pertaining to CPCB, over which the State Government has no authority to legislate¹²⁰.

Despite above horrible defects, the framework of J&K Air Rules of 1987 is a clear manifestation of prompt concern shown

a)	(i) National High Way in plain areas	750 meters
	(ii) National High Way in sub-mountainous areas	500 meters
b)	i) State High Way, District and other roads in plain areas	500 meters
	(ii) State High Way, District and other roads in sub-mountainous areas	350 meters
c)	Municipal limits of Srinagar and Jammu cities	5 Kms
d)	District Head Quarters	2 Kms for brick Kilns/3. Kms for stone crushers
e)	Nearest residential <i>areas/Abadi</i> brick	3/4 Kms. for Kilns/1.5 Kms. For stone crushers
f)	Nearest Tourist Resort/Complex	1.5 Kms.
g)	Forest Land	500 meters.
h)	Approved Water Supply of 20 Kilo Liters	1 Km.
i)	Hospital/Nursing Home/Health Centre	1 Km.
j)	Notified Bird or other Sanctuary/National Park	2 Kms.
k)	(i) Orchards/ <i>Abiawal</i> /Saffron Saffron Fields	300 meters for brick Kilns
	(ii) Agricultural land, orchards except dry/Banjar Kadeem stone crushers	500 meters for
l)	Educational or Similar other Institutions	1.5. Kms.
m)	Controlled areas crushers only	1 Km. for stone

by the State Government to address the air quality managerial problems in the state. Though late, the State Government has also appointed and constituted the 'One Man's Forest Authority' as the Appellate Authority under section 31 of the Air Act, 1981¹²¹. An efficient exercise of powers by the Appellate Authority demands equipment of it by stipulation of an adequate procedure which the State Government has missed while framing the Rules. It is not known for example whether the authority can review its own decisions in appropriate cases. Under Rule 18 (4) sub-clause (5),

fees to be accompanied with the appeals to be filed before the Appellate Authority have been left to be prescribed by the State Board, section 31 (3) read with section 54 (v) of the Air Act however delegates this legislative power upon the State Government. The sub-delegation being contrary to the principle *delegations non-potus delegate*, attempts by the State Board to prescribe such fees may prove an exercise in futility being violation of established legal norms. It is therefore desirable that the grave defects in the Rules which may prove fatal in future, be remedied through an exhaustive overhaul of the Rules after seeking opinion from the specialized experts. There is no restriction imposed upon the State Government, except prior consultation with the State Board, to frame a new set of rules under section 54 (2) of the Air Act, 1981.

Siting Criteria for Brick Kilns and Stone Crushers

Section 17 (h) of the Air Act, 1981 empowers the State Board to advise the state Government with respect to the suitability of any premises or location for carrying on any industry which is likely to cause air pollution. A draft siting criteria in respect of Brick Kinks has been approved by the Board after its publication in a local daily¹²². Similarly the Board has adopted a Draft Siting Criteria for Stone Crushers. The effectiveness of the two drafts though dependent upon their adoption by the State Government, nevertheless the Board has initiated implementation thereof in the state. By and large the two drafts adopt an identical approach in prohibiting installation /operation of brick Kilns and stone crusher units within the limits/distance shown against each of the specified areas shown on page 147.

Besides brick Kilns/stone crushers set up in clusters can be provided only on approach from National High Way/scheduled Road and on approach road to a cluster of five or more brick Kilns/stone crushers is not to pass through any village. Stone crushers in clusters are to grow green belts around clusters consisting of three rows out of which one row shall consist of tall leafed trees and two rows of medium leafed trees.

The two drafts have laid down location norms in an exhaustive way and have considerably improved the earlier guidelines adopted

by the Board. The draft Siting Criteria for Brick Kilns however do not expressly repeal the earlier guidelines adopted by the Board. The fate of those units which have been established in the state in accordance with the location norms of the Board notified in 1990-91 guidelines is not known. It appears that the Board has not disturbed/changed the said location norms for lime Kilns and coal briquetting units. The criteria for stone crushers does not reveal as to whether the Board has proceeded to frame the criteria under the Air Act, 1981 or the Environment Act, 1986, which is of vital significance for sustaining the validity of the norms in courts.

Batteries (Management and Handling) Rules, 2001

The J&K SPCB is the Prescribed Authority¹²³ to ensure compliance of the Batteries (Management and Handling) Rules, 2001¹²⁴. The rules aim to bring down lead emissions to the atmosphere, discharge of acid into open ground sewers and loss of lead due to poor recovery from backyard smelting of lead acid batteries. The consumers and bulk consumers of lead acid batteries are made responsible to ensure that such batteries are not disposed of in any manner other than depositing with the dealer, manufacturer, importer, assembler, registered recycler, reconditioner or at the designated collection centres¹²⁵. Collection centres can be set up either individually or jointly¹²⁶. Bulk consumers such as Central/State Government departments, State Road Transport Undertakings and original equipment manufacturers such as automobile manufacturers have been exempted from the obligation for collection¹²⁷. Manufacturers, importers, assemblers, reconditioners, and dealers are to ensure that the used batteries are collected back against new batteries sold excluding those sold to original equipment manufacturers and bulk consumers, and file half yearly return of their sales and buy back to SPCB¹²⁸. Dealers are to give appropriate discount for every used battery returned by the consumer¹²⁹. Bulk consumers/auctioneers can auction used batteries only to the registered recyclers¹³⁰. The stake-holders are to ensure that no damage is caused to the environment during transportation or storage of the lead acid batteries, make all records relevant, available for inspection by the Board and create mass awareness with regard to hazards of lead and obligation of consumers to return used batteries to the registered dealers or

deliver at the designated centres¹³¹. Recyclers of used lead acid batteries are to apply and seek registration from the Ministry of Environment and Forests or any officer designated by it after getting consent/authorization from SPCB under the Air, Act, 1981 Water Act, 1974 and the hazardous Waste (Management and Handling) Rules, 1989 and certificate of registration from District Industries Centre¹³². Manufacturers, importers, assemblers and reconditioners are under obligation to bring any violations by dealers to the notice of the State Board or the Ministry of Environment and Forests¹³³. The State Board is to monitor the compliance of conditions prescribed in the certificate of registration for recycling¹³⁴. The 'Criteria for Labelling of Lead Acid Batteries' also mandates that the lead used in batteries shall be recovered/ manufactured through a process complying with the provisions of the Water Act, 1974, the Air Act 1981 and the Environment Act, 1986 and rules made thereunder¹³⁵.

The Environment Act, 1986 has proved to be a vehicle for day to day environmental legislation minimizing thereby the scope for state intervention in evolving environmental norms. The Central Government acting on the basis of the Environment Act, 1986 continues to invest the state boards with new kinds of powers to which the J&K State Pollution Control Board is no exception. The powers of the State Board under the new sets of rules are numerous. As prescribed authority the State Pollution Control Board is to bring the ozone level down in the state by ensuring compliance with the Ozone Depleting Substances (Regulation and Control) Rules, 2000. Likewise as a prescribed authority under the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended in 2000, it is to ensure strict compliance with the emission norms laid down under the rules for incineration of bio-medical waste¹³⁶. It has also been conferred with powers to implement in the state several other sets of rules relating to industrial, solid waste, municipal waste, and plastic waste notified under the Environment Act, 1986¹³⁷. The Central Government has conferred necessary powers upon the State Government to issue directions under section 5 of the Environment Act, 1986 to any industry, local or other authority for violations of the Environment Act, 1981¹³⁸. The chairman J&K SPCB has also been conferred with such powers to implement the standards and rules relating to bio-medical waste, hazardous chemicals, industrial solid waste including plastic

waste¹³⁹. To curb the pollution as a result of fly-ash, generated from coal or lignite based thermal power plants the Board is the authority to ensure that manufacturers of bricks, tiles or blocks used for construction purposes, who operate their units within 50 kilometre radius of thermal power plants, utilise die generated fly-ash in manufacturing bricks, tiles etc. and that the power plants generating fly-ash also utilize the same in their own construction activities¹⁴⁰.

The new wave of conferment of powers upon the State Government seems to have brought momentum in the Government and the State Board to curb the menace of air pollution in the state. As a step in the right direction the Government has, acting in exercise of powers under section 19 (5) of the Air Act, 1981 and in consultation with the State Board, prohibited the burning of rubber tyres in the state¹⁴¹.

SUGGESTIONS

To minimize the use of diesel sets the hydraulic resources need to be taped to the optimum to generate power. As an emergency measure common generator sets in especially commercial areas need to be encouraged to reduce air pollution problems from mushroom number of generator sets.

A special drive to increase the forest cover needs to be launched in especially those districts where it is much below the requisite cover to ensure ecological balance. The industrial estates housing industrial units cover huge land but the number of functional and non-functional units is almost equal. The non-functional units need to be revised and where non-functional units do not opt for revival fresh entrepreneurs need to be encouraged to be located in industrial estates. This can facilitate proper land use for industrial purpose both within as well as out side industrial estates.

A committee composed of experts from SPCB, state Industries department can facilitate an inventory of SSI Units in each district with potential to pollute so that the boards consent management and administration programme becomes successful. In the absence of such a comprehensive inventory the statutory consent seeking programme would not be successful, thereby affecting the revenue generation potential of the board adversely. Although steps in this

behalf have already been taken by the Board for preparation of industrial inventory, fruitful results are yet to come before the public for lack of coordination by stake holders including especially the governmental departments. Special measure need to be undertaken by the board to promote such coordination.

Inconsistency of the existing environmental laws with some older laws related to environment will always favour the polluter. A polluter will like to get prosecuted under the penal provisions of older laws rather than comply with the new laws. Keeping the punishment scheme in section 24 of the Environment Protection Act 1986. In view which gives effect to punishment scheme of older laws, polluters have back doors widely open to earn more and more out of polluting activities and pay paltry fines that too after lengthy litigation.

The "Air Prevention and Control of Pollution Rules 1987" adopted by the board are too much faulty and seem to have been adopted in a hasty manner. An expert body consisting of legal experts need to review the working of all environmental laws, old and new so as to recommend the suitable measures for an exhaustive overhaul of older environment related laws in J & K. The need for such an extensive review of such laws is urgent to make the new central environmental laws workable without effecting the regulatory and licensing mechanism under the older state laws.

The board seems to be too much dependent upon the expertise of the state forest department. Superior officers like Regional Directors or Secretary have so far been deputed by the government mostly from the forest department. Although protection of environment includes protection of forests but environment includes multifarious dimensions. Officers from forest departments may have gained experience in the working of Forest Act which is colonial vintage but in the absence of any special training in modern environmental laws, innovative approaches to curb the menace of pollution can hardly be expected from such officers especially when they are heavily intoxicated with the colonial philosophy of the Forest Act. Steps need to be undertaken to train forest officers generally with the modern philosophy of environmental laws where they have to play the role of an educator, advisor and helper to achieve optimum compliance. The faculty of law of the University of Kashmir, possessing requisite

expertise in the field can be approached to develop modules of such training programmes and train officers of the Board and the forest department in the beginning in environmental laws. This programme can be later on extended to other state departments and agencies as are related to the protection of environment.

NOTES

1. Lawrence, Walter R., 'The Valley of Kashmir' (Kashmir Kitab Ghar) 1996 ed. p. 13, the author while confessing his incapacity of appreciating the beauty of scenery quotes Kalhana from 'Rajtrangini' who once said, "it is a country where the sun shines mildly, the saffron, iced water and grapes, which are rare even in heaven, are common here. Kailasa is the best place in the three worlds, Himalaya the best part of Kailasa, and Kashmir the best place in Himalaya".
2. Id.
3. Id., at p. 14.
4. See Government of Jammu and Kashmir, 'Digest of Statistics 2000-2001', Directorate of Economics & Statistics, Planning and Development Department, p.3, out of its total area of 2,22,236 sq. kms., an area of 1,20,849 sq. kms. is under occupation of Pakistan and China.
6. Id., at p. 6.
7. Id., at p. 6.
Id., at pp. 28-29.
8. Id., at p. 155, as against the existing installed capacity of 537.76 megawatts (which is only 3% of the harness- able potential and around 18% of the existing requirement) the state can generate an estimated 18000 megawatts from hydraulic resources.
9. Id., at p. 158, the Kalakote Thermal Power Plant has 22.50 megawatts, the Diesel Generating Set Leh /Kargil 12.74 megawatts, the Pampore Gas Turbine [I] 75 megawatts and Pampore Gas Turbine [II] has 100 megawatts capacity.
10. See Dar, M. Ayub., 'Indigenous Medicinal Plants and the People: Modulating Conservation and Law in Action in Jammu and Kashmir', 8 KULR 2001 pp.17-62.
11. Id.
12. Environmental Awareness Forum v. State of J&K and Others 1998 (6) SCALE 21 (SP).

13. 1998 (5) SCALE 21 (SP).
14. See Jammu and Kashmir Government, Forest Department, 'Handbook of Forest Statistics - 2000', (Divisional Forest Officer Statistics Division, Srinagar) at p.21, from 1997 to 2000 as many as 1218 incidents of fire have affected an area of 90.73 sq. kms. of forest.
15. See Industrial Review J&K State 1988-89 prepared by Plan and Statistical Section of the Directorate of Industries and Commerce, Govt. of J&K at pp. 6 and 7. As against 6387 small scale industrial units registered with the Directorate of State Industries up to 31.3.1980, the total number of such registered units had reached to 26312 up to 31.3.1989. As many as 2400 such units had sought registration from 31.3.1989 to 31.3.1990. On the basis of this growth rate the number of such registered units was expected to be 43122 up to 31.3.1996. The number does not however include units as had not sought registration with the Directorate.
16. Directory of Small Scale Industrial Units of Budgam district upto ending December, 1985, Directorate of industries and Commerce (Statistical Nucleus Cell) J&K State at pp.30.38:141 brick kiln manufacturing industries had been registered with the Directorate of Industries in District Budgam upto December 1985 alone with 90% of such units being in the mid of residential areas. The number did not include units as had not sought registration nor did it include those units as might have sought registration during the period 1985-2002, See also Kashmir Times, dated November 18, 1995 at p.3 where residents of Bahu Fort (Jammu) cry for justice (through the Grievance column of the daily) as an Aluminum Casting Bathi run with the help of mineral coke and arsenic spew out poisonous smoke causing breathing problems, the polluting unit was reported very much in the residential area with a High School merely hundred feet away. Despite assurances and spot visits by authorities including Pollution Control Board, the residents continued to suffer.
17. The Greater Kashmir dated Aug. 5, 1994 p. 1, Aug. 16, 1995 p.1 and December 8, 1994 p. 1. in addition to the Toxic emission from brick kilns, the Khrew Cement Plant of Jammu and Kashmir Cements Ltd. continued to produce 600 metric tones of cement per day for the past so many years without installing antipollution devices and was thus allowed to maximise its profits and spew out dust and fumes which was seen dancing miles away in the atmosphere. Further a huge number of stone crushing units, poultry farms, rice and other

- husking mills have been allowed to be established either in the mid of human settlements or adjacent to roads and agricultural lands.
18. Industrial Statistics J&K State-2000-2001, pp.iv-v, an amount of Rs. 7433.28 lakhs has been provided during 1995-2000 as incentives, the package of incentives includes 4% CST on raw material, 30% capital investment subsidy, 100% D.G. set/stabilizer subsidy, 100% testing equipment subsidy, 50% interest subsidy on working capital, 100% Project Report subsidy, 4% CST exemption on machinery, Toll tax exemption and transport subsidy.
 19. See Industrial Statistics, J&K State-1998, Directorate of Industries & Commerce, p. 151.
 20. *Id.*, at p. xi.
 21. See Digest of Statistics 2000-2001 in *supra* note 4 at pp. 203-204
 22. *Id.*, at p. 209
 23. For an exhaustive study of such units as have been exempted from seeking consent by the State Board see * Annexure- IF appended to this study.
 24. Fotedar, B .K. and Singh, B. P., 'Environmental Protection with respect to Lead', Kashmir Times, dated November 24,1994 p. 10, the study by the authors shows high concentration of lead in the natural waters of Kashmir Valley (Dal Lake, Jhelum River, Zabervan mountain springs)as compared to Jammu .The authors noticed an increase of 8.23% of lead from the year 1990 to 1992; see also The Kashmir Times, dated April 24,1994 (Sunday Times) p.1, the daily reports that as many as 1,35,180 vehicles used to pass through Tawi Bridge of Jammu for only twelve hours a day. The report though older is useful in estimating the existing scenario given the pace of increase in the vehicular fleet from 1994 till date.
 25. See Jammu and Kashmir State Pollution Control Board - 'Annual Report 2000-2001'pp. 18-19.
 26. *Id.*, at p.21, as many as 693 D.G. sets in the capacity range of 1 to 320 KVA have been noticed by the Board as operating in Kashmir Valley alone.
 27. *Id.*, at p.20, under these guidelines D.G. sets above SKVA are not allowed in residential areas between 2 p.m. and 6 p.m. and can be operated at permissible times only in acoustic enclosures subject to the prescribed standards of noise and emissions.
 28. This is evident from the provisions of some old laws, see discussion *infra*, and note 64 and the accompanying text.

29. The Constitution of Jammu and Kashmir, section 10.
30. Id., section 24.
31. Id., sections 14 -15.
32. See the Jammu and Kashmir Legal Services Authorities Act, 1997, section 4 conferring such powers upon the State Legal Services Authority with an additional responsibility to train social workers in the legal skills in this behalf.
33. Under the Code of Criminal Procedure where pollution of air amounts to public nuisance, or the conduct of any trade or occupation or the keeping of any goods or merchandise is injurious to the health or physical comfort of a community or the disposal of any substance is likely to occasion conflagration or explosion, a speedy and summary remedy is available under Section 133 to remove the nuisance or stop or regulate the trade or other activity through the orders of a magistrate. Similarly section 91 of the Code of Civil Procedure, 1920 ensures civil right of action in the case of public nuisance. This section after its amendment in 1983 reads:

"In the case of a public nuisance or other wrongful act affecting or likely to affect, the public, a suit for a declaration and injunction or for such other relief as may be appropriate in the circumstances of the case, may be instituted by the Advocate General or with the leave of the Court by two or more persons, even though no special damage has been caused to such persons by reason of such public nuisance or other wrongful act". The section also saves any right of suit which may exist independently of its provisions.
34. Section 278 of the Rambir Penal Code; See also 1989 Supplement to the laws of J&K at pp.73, 74, 81 and 82 ,sections 56,58 and the appended schedule (item 14 and 17) of the J&K Panchayati Raj Act 1989 make the offences under sections 278 and 285 of the Code cognizable by Panchayati Adalats in villages provided the offence is punishable only with fine upto Rs. 1000.00
35. Id., sections 284,286 and 285 of the Code.
36. See in this behalf Schedule 'D' to J&K Laws Vol. (V) 1973 ed., J&K Govt. publication, in place of Poisons Act, 1977 (Samvat) 1912 A.D.) of the State, the Central Poisons Act, 1919 has been made applicable for limited purposes only by the Central Poisons (Amendment) Act 1958, Explosive Act of 1977 (Samvat) replaced for the Indian Explosives Act, 1084 by the Part (B) States Laws Act, 1951 which also introduces the Explosive Substances Act, 1908 (Central) in the

- State. The Petroleum Act, 1977 (Samvat) replaced by the Central Petroleum Act, 1934 through the J&K (Extension of Laws) Act, 1956. Besides, the operation of Inflammable Substances Act, 1952 has also been extended to the state.
37. Section 7 of the Explosives Act.
 38. The J&K Boilers Act, 1934, section 2(b) of the Act defines a 'boiler' as 'any closed vessel exceeding five gallons of capacity which is used expressly for generating steam under pressure for use outside such vessel, and includes any mounting or other fitting attached to such vessel, which is wholly or partly under pressure when steam is shut off.
 39. Id., sections 6 to 8 and 17.
 40. Id., sections 5, 23 and 24.
 41. The period of six months under section 26 of the Indian Boilers Act, 1923 has been enhanced to twenty four months by an amendment in 1960.
 42. The Gazette of India, dated 24.12.1970 pt. II S.I. Ext. 602. The Central Labour laws (Extension to Jammu and Kashmir) Act, 1970 extends all such Central Labour Acts to the State as are specified in its appended Schedule; See also Malhotra, OJP.etal, 'The Law of Industrial Disputes', (3rd ed. 1981) vol. II, pp.68-71.
 43. 'The Lawyers Collective', July, 1986, p. 54; See also Gahlan, R.S., "Noise Pollution and Law" in 'Environment Administration Law and Judicial Attitude' edited by Diwan Paras and D. Peeyushi (1992 ed.) Deep and Deep Publications p.441.
 44. Gazette of India, Extraordinary. Part II Section 3(ii) p.385. The Industries (Development and Regulation) Amendment Act, 1961 makes the Act applicable to the State by omitting the words except the State of Jammu and Kashmir in section 1(2) of the main Act. Notification No. SO 458/EDRA/a/62, dated Feb. 7, 1962 notifies the date of operation of the Act from Feb. 15, 1962.
 45. Sections 35 and 40 of the Jammu and Kashmir Land Revenue Act, 1939, the rights so vested in the Government can be exercised subject to payment of compensation to a private owner for the occupation or disturbance of the surface of his land.
 46. Kashmir Times, dated June 15, 1994 p.1, although the State through J&K Minerals Ltd. is trying its best to increase the production of gypsum to one lakh tones annually, the Central Department of

Mines and Safety has directed suspension of the work for some time to restart it with adequate safety measures and in a planned manner.

47. Section 18 of the Mines and Minerals (Regulation and Development) Act, 1957 as amended in 1986 and as applicable to the State of Jammu and Kashmir.
48. Section 10-A of the Jammu and Kashmir Ancient Monuments Preservation Act, 1920; see also the Ancient Monuments and Archaeological Sites and Remains Act, 1958 as replaced by the Central Antiquities and Art Treasures Act, 1972.
49. Section 137 of the Municipal Act, 1951 lists following such trades, trade units and manufactories: melting tallow, dressing raw hides, boiling bones, offal or blood as a soap house, oil boiling, dyeing tannery or gut scrapping, brick kiln, charcoal kiln, pottery or lime kiln, trade in unslaked lime hay, straw, thatching glass, wood, charcoal or coal or other dangerously inflammable material, any explosive or petroleum or any inflammable oil or spirit.
50. Id., section 137(3), section 235 authorises an Executive Officer of a Municipality to inspect any house or building which is suspected to contain petroleum, explosive or other inflammable material in excess of permitted quantity and on discovery of any excess quantity to get the same confiscated under the orders of the Magistrate.
51. Id., section 140.
52. Id., section 141; likewise any person who, without the permission of the Executive Officer beats a drum or tom-tom, blows a horn or trumpet or beats or sounds any brass or other instrument or utensil or uses a loudspeaker is punishable under section 215.
53. Id., sections 219,216,217,193.234,195 and 183-192
54. Id., section 220.
55. Lal's Commentaries on Water, Air pollution and Environment Protection Laws, (3rd ed. 1992), Law Publishers India (P.) Ltd. at pp. 866,868, as the third largest tobacco producer of the world consuming three-fourth of its production, India sells ninety billion cigarettes and hundred million bidis every year in its territory. The world spends US \$ 240 million a day on cigarettes while US \$ 80 million a day are required to be spent for only a decade to provide clean water and adequate sanitation to everyone in the world.
56. Id., at p.866.
57. The Juvenile Smoking Act, 1929, section 3; see also 1989 Supplement to the J&K Laws at pp. 73,83 where section 56 and the appended

schedule (item F) of the J&K Panchayati Raj Act, 1989 give powers to the Panchayati Adalats to try offences under the Juvenile Smoking Act, 1929 in villages.

58. Id., section 4, such persons are teachers of recognized schools, colleges, magistrates, legal or medical practitioners, lambardars, members of Municipal and Notified Area Committees but the power can be exercised with respect to a boy under sixteen years of age and not girls especially female tourists of such age whose smoking habits in public places or vehicles may often result in an instigation.
59. See the Act in J&K Laws Vol. IV (1959 ed.) pp.373-374.
60. Section 6 of the Opium Smoking Act, Section 2 (c) of the Act defines prepared opium as the product or admixture of opium obtained by any operation or series of operations designed to transform opium into an extract suitable for smoking and includes Chadu, madak and the dross of other residue remaining after opium is smoked.
62. Id., sections 13, 30 and 31.
63. Id., sections 22,23.
64. See the Rules in J&K Laws Vol. 1(4th ed. 1990) p.431. The Rules have been issued pursuant to Ailan No. 7, dated 5th Har, 1969 (Samvat); see also J&K Laws Vol. 1(ed. 1971) at p.224, Section 4(1) (b) of the Sri Pratab Jammu and Kashmir Laws consolidation Act, 1920 A.D. treats an Ailan at par with an Act, declares it as law of the state to be administered by its Civil and Criminal Courts; section 157 of the Constitution of Jammu and Kashmir and part XXI, Clause b(11) of the Constitution (application to Jammu and Kashmir) order, 1954 treat such aliens as law in force in the State.
65. Baxi, Upendra, Environment Protection Act: An Agenda for Implementation (ILI Publication) 1987 N.M. Tripathi Ltd. at p.21 where it has been argued by some environmental experts that the idea that there are safe locations outside the metropolitan centres is inimical to the promotion and protection of environment. The argument appears true with equal force in respect of municipalities and town Areas, see also the views of Calcutta High Court in peoples United for Better Living in Calcutta-Public and others v. State of West Bengal, AIR 1993 Cal. at p.220 where the Court holds that "the obsession with the phenomenon of pollution which is associated with the urban areas make us loose sight of environmental conditions of the rural areas".

66. See Rules regarding Recovery of Royalty on Building Materials in Jammu Province (1903 A.D.) and the appended form "A" in supra note 64 at pp. 437,441.
67. Id. Rule 12; see also the Rules quoted in supra note 64, Rule 9.
68. Under Rule 6 of Brick Kiln (Construction) Rules for Kashmir Province, Rs. 12 per annum is payable for every Kiln even if the Kiln works only for a part of the year; see also Times of India, dated 5th June, 1995 at p.15, in India brick and aggregate industry are disturbing approximately 23 billion cft. and 15 billion cft. of earth each year. The cost of reclamation has been variously estimated by researchers as anything between Rs. 300 and Rs. 600 for each brick produced from earth.
69. J&K Laws Vol. ffl (1972 ed.) pp.476.
70. State Pollution Control Board Guidelines for Industries 1990-91 (Government of Jammu and Kashmir) at p.40.
71. See Diwan, Rosencranz. et al., 'Environmental Law and Policy In India' 2nd. ed. 2001 (Oxford University Press) p. 53 where it has been expressed that apart from Art. 21
72. The right to equality guaranteed under Art.14 of the Constitution may also be infringed by Government decisions having an impact on environment.
73. See Baxi, Upendra in supra note 65 at p.21; see also section 2(a) of the Environment Act, 1986.
74. The Wild Life (Protection) (Amendment) Act, 2002, section 5 1-A (a), the Act has been published in the J &K Government Gazette, vol. 115, No. 1 -2, dated 4th April 2002.
75. Id., section 51(c), the punishment for the offence is from three to six months and fine upto five thousand rupees.
76. The Jammu and Kashmir Motor Vehicles Rules, 1972, Rules 8-9 and 8-14.
77. Id., Rule 8-14A (added vide SRO 301, dated 28-5-1979; see also State Pollution Control Board 'Guidelines for Industries 1990-91, p.51, notifying such emission standards.
78. Id., Rule 9-41; see also Rule 9-33 which prohibited use of horns in parking place and cab-rank.
79. SRO-276, dated 24th September, 1991.
80. The Jammu and Kashmir Motor Vehicles Rules, 1991, Rule 307.
81. Id., Rules 203 and 204.

82. See SRO-353, dated 20th December 1991 issued vice Commissioner/ Secretary to Government Food, Supplies and Transport Department No. TR-26/85DGT, DATED 20-12-1991. The other authorities authorized to compound offences include the Transport Commissioner, IGP and Deputy IGP Traffic, Deputy IGP in charge Ranges, District Magistrate, RTO and Assistant RTO, SP and Deputy SP Traffic, Inspector, Sub Inspector Traffic and Motor Vehicles Inspector. Id.
84. See the Air Act, 1981, section 20.
85. Circular issued by the Principal Secretary to Government Transport Department under No. TR-52-90/DGT-I, dated 30-6-1999.
86. See the Preamble to the Water (Prevention and Control of Pollution) Act, 1974, water being a state subject, such a resolution was essential under Article 252 (1) to empower the Parliament to enact the law.
87. The Water Act, 1974, section 1(2) and (3).
88. See SRO 85, dated 29th January 1986.
89. Government Order No.34 of 1987, dated 3-8-1987, Environment, ecology Science and Technology Department, Government of Jammu and Kashmir, the order created limited number of posts for the Board, established State Laboratories and provided for the allocation of funds, contingent expenditure, and directed the head quarters to be as with the Government.
90. The Air Act, 1981, section 4.
91. For structural analysis of the U.S. Clean Air Act, see Findley, Roger W., Farber Daniel A, 'Environmental Law in a Nutshell' West Publishing Co. (1991, 3rd ed.) p.100 .
92. The Air Act, 1981, section 17 (a), (b) and (g).
93. Id., section 2 (a) as amended by Act 47 of 1987, but whether this definition is adequate is still a matter for some debate- for a detailed study see Chatturvedi, R.G., and Chatturvedi MM., 'Law On Protection of Environment and Prevention of Pollution' ,1993 ed., The Law Bode Co. Pvt. Ltd. at pp. 51-68, and Kurup P.G., 'Environment Act-A Scientist's View' in P. Leela Krishnan ed., 'Law and Environment' (1992) at pp.26,32 and 38.
94. Id., sections 19 and 21.
95. Id., sections 22 and 22-A.
96. Id., section 37 read with section 21.

97. Section 24 (2) of the Environment Act, 1986 reads: 'Where any act or omission constitutes an offence punishable under this Act and also under any other Act then the offender found guilty of such offence shall be liable to be punished under the other Act and not under this Act.'
98. See *supra* notes 64 and 67.
99. See *supra* note 70, the Board has not indicated the relevant Act under which it has proceeded while issuing the Siting Directive, for the sake of present study however it is taken as having been issued under the Environment Act, 1986, though before fixing the criteria the Board ought to have followed the procedure of effective hearing as guaranteed under Rule 5 of the Environment (Protection) Rules, 1986.
100. The Environment Act, 1986, section 6 (2) (b) and the Air Act, 1981, section 2(a) as amended by Act 47 of 1987.
101. See the Schedule to the Noise Pollution (Regulation and Control) Rules, 2000. Earlier noise standards inserted in the Environment Rules, 1986 by GSR (E), dated 26-12-89 {Central} recognized night time as between 9 p.m. and 6 a.m. which was anomalous to section 4 of the Instruments (Control of Noises) Act, 1959 which recognized such night time as between 10 p.m. and 6 a.m., making thus a permissible activity under the local Act and occurring during 9 p.m. to 10 p.m. a contravention of the repealed noise standards, punishable under the Environment Act, 1986.
102. The J&K Instruments (Control of Noises) Act, 1959, section 5.
103. *Id.*, under section 1(2) of the Act, operation of the Act has been extended to few towns, notified areas and municipalities of the state.
104. The Air Act, 1981, section 16 (b).
105. *Id.*, section 41 ;see also the Environment Act, 1986, section 17, section 6 of the Instruments (Control of Noises) Act, 1959 gives blank license and immunity to Government Departments to cause noise pollution upto any extent which is contrary to the scheme of the Air Act, 1981 and the Environment Act, 1986 where Governmental Departments are, through their heads, made liable for all environmental offences equally as ordinary polluters.
106. The Pioneer, dated 28th September 1995 at p.10 with the caption 'Polluting Industries', reporting that the U.P. State Pollution Control Board through its officers had relaxed the provisions in respect of ambient air and water qualities to give consent to polluting industries

- to go ahead with their polluting activities for which the Supreme Court in August 1995 fined the said officers for daring to interfere with the benchmarks set by the CPCB. It has been repeated that the state of affairs in other states is in no way different.
107. J&K State Rambir Penal Code Act, 1989 (Samvat), 'Chapter IX- Offences by or relating to Public Servants, sections 161-171', the maximum punishment for preparing an incorrect document or showing favour in any official act is one year or two years and or fine under sections 163 and 165 of the Code.
 108. The Air Act, 1981, section 54 (1), the matters *for* rule making reserved for Central and state Governments have been specifically provided in section 53 and 54 (2) respectively.
 109. Id., section 54 (3).
 110. SRO 89, dated 20th February, 1987, published in J&K Government Gazette, dated 20th February 1987, Vol. 99 [No.47-h].
 111. For a comparison of the two sets of Rules see Annexure (in respect of J&K State Rules) and GSR No. 6(E), Dated 21-12-1983 (in respect of Union Territories Rules of 1983) framed by the Central Government for the state of Delhi.
 112. The Air (Prevention and Control of Pollution) Rules, 1987, Rule 2 (b) and (c).
 113. Id., Rule 10 (2) [Form II in respect of Notice of Inspection], Rule 13 [Form III Notice of Intention to have Sample Analysed], Rule 14 [Form V for Report of Board Analyst], Rule 18 (wrongly numbered as Rule 81 in the Rules) [Form VII for Memorandum of Appeal] and Rule 21 [Form VI for Consent Register], all these important Forms are missing in the Rules but repeatedly referred to in the State Air Rules.
 114. See Annexure II appended to this study.
 115. The Air (Prevention and Control of Pollution) Amendment Act 47 of 1987, section 25 [with effect from 1-4-1988].
 116. SRO 7, Government of Jammu and Kashmir, Forest Department, dated 6th January 1999.
 117. See *supra* note 112, Rules 9-18, Rules 3-7 relate to appointment germination, tours and emoluments of Consultant and the secrecy to be adopted by an appointed Consultant in respect of information of the Board.

118. See SRO 88, dated 20th February, 1987, published in the J&K Gazette, dated 20th February, 1987, Vol. 99, [No. 17-g], these Rules too suffer some of the defects projected in respect of the Air Rules of 1987.
119. See GSR No.712 (E), dated 18-11-1982 notifying the Air (Prevention and Control of Pollution) Rules, 1982.
120. The Air Act, 1981, section 54 provides: Subject to the provisions of sub-section (3), the State Government may, by notification in the official Gazette, make rules in respect of matters not falling within the purview of section 53.
121. SRO 32, dated 17th January 2001; see also SRO 31, dated 17th January 2001 constituting 'he One Man's Forest Authority' as the Appellate Authority for purposes of section 28 of the Water Act, 1974 as well
122. See Kashmir Times, dated 31-10-1999, published under Board's No. DIPKNB 1814-15, dated 29-10-1999.
123. As Prescribed Authority to ensure compliance with the Rules the State Board has notified, the responsibilities imposed, to the public through a local newspaper-see the daily 'Aftab', dated 8th September 2001, p.4.
124. Ministry of Environment and Forests, Notification No. S.O. 432 (E), dated May 16,2001 published in the Gazette of India, Extra ,Part II ,Section 3(ii), dated 16th May, 2001, pp.14-29, No.311.
125. The Batteries (Management and Handling) Rules, 2001, Rule 10.
126. Id., Rule 4 (IV).
127. Id., Rule 10, such consumers are however bound to submit half yearly returns to the State Board.
128. Id., Rule 4 and 7.
129. Id., Rule 7(11).
130. Id., Rule 10 (3).
131. Id., Rule 4 (VI,) VII,) VIII), Rule 7 (V), (VI), and Rule 8(VI).
132. Id., Rule 9.
133. Id., Rule 4 (XI).
134. Id., Rule 9 (8).
135. See GSR No. 625 (E), dated 6-9-1995.
136. See Schedule V (prescribing emission standards for incineration) and Rule 7 (designating State Board as the prescribed authority) of

the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended in 2000.

137. See Hazardous Waste (Management & Handling) Rules, 1989 as amended in 2000; Municipal Solid Waste Management & Handling Rules, 2000, Rule 6, Schedule III (in respect of ambient air quality monitoring), Recycled Plastics (Manufacture and Usage) Rules, 1999 mandating recycling of plastics in accordance with the standards prescribed by the Bureau of Indian Standards.
138. S. O. No. 881 (E), dated 22-9-1988, the delegation of power upon the state Government is subject to its revocation or invocation by the Central Government at any time whenever considered necessary in the public interest.
139. See S. O. No. 327 (E), dated April 10, 2001, published in the Gazette of India, Extra. , Part II, Section 3(ii), dated 12th April 2001, pp. 2-3, No. 235.
140. S. O. No. 763 (E), dated 14th September 1999, the notification was issued by the Central Ministry of Environment and Forests pursuant to directions of the Delhi High Court in Centre for Public Interest Litigation, Delhi v. Union of India [CWP No. 2145/99] asking the Ministry to notify the norms at the earliest under section 3(2) and 5 of the Environment Act, 1986.
141. See SRO 145, Government of J&K, Forest Department, dated 19th May, 2000.

CHAPTER 23

Ode to a Tree

DWARKA NATH MUNSHI

He never forgot
How I watered his roots
And he returned my love in a hundred ways.

He sang me to sleep
When I was a child
And taught me to frolic
And jump and play,
Never forbade me a thing
Nor showed any rage.

As he grew in age
He burst into flowers.
Spring came, he yawned into youth
Bedecked himself with floral scents and fruit
Turning the world to paradise.

When the sun rained fire
He doused the flames,
When the tempest raged
He acted as a shield.

Birds came
And he gave them shelter,
He offered sturdy sticks
To those who could not walk.

He helped everyone
But himself lived on air,
Drank foul air and gave pure oxygen in return.

He stored water in his roots
And saved the topsoil.

He did good all his life
Even unto his death.

But man, ungrateful wretch that he is
He destroyed the tree.

O youth of the world!
Remember the good the tree does to you
Save him so that you save yourself
And quaff the nectar of immortality!

*(Original in Urdu by Dwarka Nath Munshi
Translated into English by M.K. Kaw)*

वृक्षदेव की शान में

कभी मैंने था उसको पानी पिलाया
 जो बात अब तलक यह नहीं भूल पाया।
 समय पर इसने मुझे क्या-क्या दिया है
 कि सारा स्नेह है इसी में समाया।
 मुझे याद है मेरे बचपन में इसने
 मुझे नींद से जाग में थपथपाया।
 लडकपन में क्या खेल इसने खिलाए
 तभी फूलना कूदना भी सिखाया।
 न रोका व ओका व काटा डराया
 न इसने कभी कोई गुस्सा दिखाया।
 बड़ा होके देखा यह क्या खिल उठा था
 कि दुनिया को था इसने जन्मत बनाया।
 वह सूरज की आग बरसी तो उसने
 इक शीतल से दामन दे हमको सुलाया।
 और सुफां था इस दिन किस गजब का
 यह छाता सा फैला और हमको छुपाया।
 बहार आई जब इसने अंगड़ाई ले ली
 और फल फूल खुशबू से खुद को सजाया।
 बड़े जीव आए इसे देखने को
 जिन्हें इसने सीने में अपने बसाया।
 जो कमजोर थे और चल फिर न सकते
 छड़ी देके उनको भी आगे बढ़ाया।
 गरज यह कि है लाभ बे अंत उसके
 मगर खुद हवा के सिवा कुछ न खाया।
 हवायें भी जो गैस और गंदगी थी
 वह खाई और हमें आक्सीजन पिलाया।
 जो बारिश हुई इसने जड़ में समाई
 और मिट्टी का बहने से बिलकुल बचाया।

कहां तक मैं उसके गुणों को गिनाऊँ
 मुझे और जरदी मेरा घर बसाया।
 यह जीवन दे नेकी ही करता चला था
 फिर मरके भी सेवा से हटके न आया।
 अब मानव की गन्दगियों को भी देखो
 कि ऐसे मित्र को करविन मिटाया।
 तुम्हारे भविष्य को अरे नौजवानों!
 भलाई उन्होंने है बेहद लुटाया।
 उठो और बनाओं तुम इस देहरवां को
 और सपना कि खुद को है अमृत पिलाया।

ورن دیو کی شان میں

لہجی میں نے تھا اُسکو پانی پلایا ۳ بات اب تک یہ نہیں بھولی پایا
 مسوئے پر تجھے اس نے کیا کیا دیا کہ سارا سنیہ ہے اس میں سما یا
 تجھے یاد دے رہے ہیں میں اس نے تجھے نیند میں جاگ میں خنجر تھپایا
 اڑکپن میں کیا کھیل اس نے کھلائے تبھی کچھ جھولنا کو دنا بھی سکھایا
 نہ روکا نہ ڈسکا نہ کاٹا ڈویا نہ اس نے کبھی کوئی ٹھنڈہ رکھایا
 ہوا ہوا کہ دیکھا یہ کیا کھل اٹھا کہ دنیا کو تھا اس نے جنت بنا یا
 دھورج کی جپ آگ ہر سوس تو اس نے ایک شیش سے دامن میں کھویم کو سلا یا
 ہر طوفان تھا اسے دن کن غصہ کا یہ چھانا سا بھیللا (ورن) کچھ چھپایا
 رانجا جب اس نے انگڑائی لی اور بھل بھول خوشبو سے خود کو سجا یا
 جیسو آئے اس سے دیکھنے کو جنہیں اس نے سینے میں اپنے چھپا لیا
 درتھے اور چل پھر نہ سکتے بھر پوری دیکھ اُنکو ہی آگے بڑھایا
 یہ کہ ٹیلا لاپ بے انت اسکو مگر خود ہوا کہ سوا کچھ نہ کھایا
 بن بھی جو گئیں اور گندگی ہی وہ کھا ہی (ورن) ہیں آکھیں سترہ بلا یا
 نہ ہوئی اس نے ہر سوس کھائی اور مٹی کو اپنے سے بالکل بچا یا
 نہ میں اسکو گٹوں کو کیناؤں تجھے اور جادی میرا گھر بنا یا
 نہ میں بھی نیلی ہی کرتا بھلا تھا بھر پور ہی سوا سے پیٹ کے نہ آیا
 کی ناز ایوں کو ہی دیکھو کہ اب ہر کو قریب بنا یا
 بھوش گئی اورے نوجوانوں نے بھلائی انہوں نے کافی لٹا یا
 (ورن) کو ستم اس میں ہوا اور کچھ نہ خود کو نہ امرت بلا یا

CHAPTER 24

The Glorious Playfield

D.N. MUNSHI

جب بادل اڑا کر آتے ہیں اور مارا میں جل برساتے ہیں
 دھڑکی کی پیاس بجھانے وہ بھر آگے بڑھنے جاتے ہیں۔
 کچھ ہوتے ہیں اُن میں چنچل جو کہتے ہیں کتیر کچل
 دیاں ریشیوں بیوں کا سکتل اور لوگ بھی پیارے ہوتے ہیں۔
 آچل بہا کر لے لیتا ہے یہ سب کا سواکت کرتا ہے
 خوشیوں سے سب کو بھرتا ہے دیاں پریم کے نامے بہتے ہیں۔
 اُس جھیل کنارے جھاڑی پر بدیل ہے لہا یا اپنا گھر
 اور نیس لے چاندی سے کس نشان سے تولتے جاتے ہیں۔
 یہاں رنگ بھرے کھس ہیں جوم اچے دیاں کتیر اپنی مہک لے
 تھنا دوں کو پھڑانے کو یہ کس ہم بھی راتیں چمکاتے ہیں۔
 دیاں روز ہی فاختہ آتا ہے بوشنوں کی راگ ملاتا ہے۔
 بیل کے سب تار بجاتے ہیں ایشواری وہ یو جا کرتے ہیں۔
 وہ دیکھو سندر بھید کھڑا پانی میں دیکھو ٹھکڑا
 اتر آئے کسے دراپن تو بتا میرے بے کسے ستر تھکاتے ہیں
 پر بت کے پار میں ون سادھوا جو شکھ شنائی آفتد سے بھرا
 دیاں کمان لگا کسے نو ذرا خود کمرشن جی داس رہاتے ہیں
 قدرت کے نظارے یہ حریکیں کچھ ہم بھی دیاں پر جا دے دیں
 ایسے ہیں ہلکے بھی ہو جائیں پھر داپن گھر کو چلتے ہیں

اگلے نے کہا جیسا کہ میں
 اٹھ کھڑاں کرتے اُن کے چہرے
 اُس شہر گ میں جا کر ہمیں
 دشتِ اہم دیان پر کرتے ہیں -
 یہاں اُنکی چال کو اب دیکھو
 مستی میں جھومتے رہتے ہیں -
 بھولوں کی مہک بھئی کی ہنک
 جادو سا بنا کر رکھتے ہیں -
 جو بادل جھبک کر نکلتے ہیں
 اور تاکتے ہیں رہ جاتے ہیں -
 اس شہر، انجیم کھیل میں
 یہ جا کے دیں سو جاتے ہیں -
 ابھی بھٹوں ایسا ہوتا ہے
 سورج چڑھتا ہے ڈھلنا ہے -
 پر بادل اُسکو چھپاتے ہیں
 گرہی لب اُنسی جراتے ہیں -
 وادی میں اُدھر سب جھوٹ ہے
 سورج درشن کو ترستے ہیں -
 پتھری اور پیٹر چل والی بھی
 سردی سے ٹھہرتے سمجھتے ہیں -
 تب اک دن ایسا آتا ہے
 جب رائدر دھنوش چڑھتا ہے
 آکاش بھی ٹپٹپ ٹپٹا ہے
 وایو سنگیت بجاتا ہے -
 پھر بادل جاگ ہی جاتے ہیں
 اور لوٹ کے واپس چلتے ہیں
 برسات اٹکرائی لپٹے ہیں
 اور پیٹر بھی برف جھٹکتے ہیں -
 دھرتی ہر پائی اُٹھکتی ہے
 پھل بھول بھی پھر سے کھلتے ہیں
 دنیا میں پیارا رنگ لاتے ہیں -
 مانو کی آشک جھلاتے ہیں
 جیون کا چکر بھی ایسا ہے -
 سکھ دکھ یوں نہایت بدلتے ہیں
 سکھ دکھ یوں نہایت بدلتے ہیں -

THE OBVERSE

کل تیر جھے اک ایسا ملا
 کئی کئی چنر یہ کیا کھینچا
 قلم مڑ کے وہ یہ کہنے لگا
 یا نہ مرنے کو آئو سے سینچا
 یہ کہیں کھوتا کرتے ہو
 گو باٹھنڈی آئیں بھرتے ہو -
 لوگوں کو جو پیارے کہتے ہو
 کہیں بھاونا میں شمع بجتے ہو -
 وہاں پیار کا نام ترانہ ہوا
 تہذیب کا کام تھا م ہوا
 وہاں دلالت آکر زور ہوئی
 عزت و عظمت بجو رہی
 وہاں ڈالا ڈھیر دیاں
 ریشموں مینوں کا سلخن تھا جہاں
 تم شکر جس سے کہتے آؤ
 وہ اک بیانیہ ہے ہائے
 وہ اندھیری ایسی چھائی
 دیاں ہر فانی کا لاہو جاؤ
 کہاں چھیلے اور کہاں جہلم
 کہاں پریت دیکھو ننگ کھڑے
 وہاں پریت دیکھو ننگ کھڑے
 مرگ سینہ ہاتھ سے آداس ہڑے
 تیرے بلبل فاختہ روتے ہیں
 کتور ڈوگر سے بھاگ گئے
 بھولول کا لٹا رہا آنکھوں میں
 وہ بھول میں انکارے ہوئے
 وہ چار تر بھرے انگٹا میں
 ہم سب کو سبکو ٹھنڈی چھاؤں
 کل بپ وہ جی کر خاک ہوا
 لہا تھا جھے ہیں آکھیں غم
 غم دھیر چھیل نہ پاؤ گے
 چھٹا دگے جل جاؤ گے
 دھڑکن کو آئیں مینے سنا
 کیوں تو نے میٹھا خودی عالم
 جب خوش میں اپنے آؤ گے
 صدیوں تک تم تر پیاؤ گے

THE OVERSE

[The text in this section is extremely faint and illegible, appearing as ghosting or bleed-through from the reverse side of the page. It consists of several lines of what might be a list or narrative, but the characters are not discernible.]

Summary and Recommendations of Seminar

Prof. S. Bhaty

Part IV

SUMMARY AND RECOMMENDATIONS OF SEMINAR

institutions of research in environmental matters. Seminars provided an interdisciplinary and holistic approach which is essential to look with a new vision for the planning of Kashmir environments. The General Secretary of KECSS, Mr. J.L. Bhat, extended his warm welcome to participants. He explained that present seminar was one among several academic seminars held by KECSS on current topics of interest to natural history and to the people of Kashmir.

It may be recalled that KECSS is making a major attempt to develop a Centre for Kashmir Studies in KECSS which will be a centre for research and generation of knowledge about Kashmir and its people (see Appendix 2). Kashmir has been a land of great learning and scholarship in history. The present writer explained the objective for the present seminar on environmental protection and sustainable development. As the Convener for the seminar, I had undertaken an academic tour of Kashmir in June 2003 and participated at the sessions on the subject with scholars in Kashmir University Department of Environment and other academic centres. I had an occasion to deliver lectures in DDC and in the College of Education

* Hony. Professor JNU and Convener of Seminar.

Part IV

**SUMMARY AND RECOMMENDATIONS
OF SEMINAR**

CHAPTER 25

Summary and Recommendations of Seminar

PROF. S. BHATT*

The seminar on 8th November 2003 by KECSS ended with an optimistic note that people of Kashmir in general have great interest in environmental issues. The movement towards environment protection and sustainable development has been initiated in recent years. This seminar was a milestone towards this goal. Participants in the seminar had come from Kashmir and various academic institutions of research in environmental matters. Scholars produced an interdisciplinary and holistic approach which is essential to look with a new vision for the planning of Kashmir environments. The General-Secretary of KECSS, Mr. J.L. Bhatt extended his warm welcome to participants. He explained that present seminar was one among several academic seminars held by KECSS on current topics of interest to national society and to the people of Kashmir.

It may be recalled here that KECSS is making a major attempt to develop a Centre for Kashmir Studies in KECSS which will be a center for research and promotion of knowledge about Kashmir and its people (see Appendix I). Kashmir has been a seat of great learning and scholarship in history. The present writer explained the objective for the present seminar on environment protection and sustainable development. As the Convenor for the seminar, I had undertaken an academic tour to Kashmir in June 2003 and participated in discussions on the subject with scholars in Kashmir University Department of Environment and other academic centers. I had also occasion to deliver lectures in DOE and in the College of Education

* Hony. Professor JNU and Convenor of Seminar.

and in S.P. College, Srinagar to gather further knowledge about the subject of seminar now held by KECSS on Kashmir environments. Mr. M.K. Kaw, the President of KECSS then gave his address highlighting the work done in Himachal Pradesh for environment protection. He has served as Education Secretary in the Government of India, and earlier as Secretary in the State Government in Himachal Pradesh. He has made an important point that Kashmir can emulate a lot of ideas and practices used in environmental management in Himachal Pradesh such as in land and forest management, and drawing new sources of energy. Both Kashmir and Himachal Pradesh are part of the Himalayan range of mountains. Even eco-tourism has been successfully implemented in Himachal Pradesh in recent years that holds promise for Kashmir.

The inaugural address by Dr. D.K. Biswas was profound in knowledge and ideas relating to the subject of seminar. Dr. Biswas is one of the outstanding scholars in the country on the subject of environments. He has been the Chairman of Central Pollution Control Board, Government of India for over a decade and was responsible for enforcing environmental policies of the Government of India and coordinating them with State Governments and with the United Nations. Under his guidance many publications have been issued and environmental laws made in the country. His observations on the management of Kashmir's environment therefore are most perceptive and need considerations by all concerned. Introducing Dr. D.K. Biswas was Professor Jawahar Dhar, himself an Emeritus Professor of CSIR and formerly Science Adviser in DST. Prof. Dhar mentioned how in India the structure for environmental work was laid in 1970s by DST, and the new departments of Environments and Biotechnology. It may be mentioned here that the present writer served for a short period in DST for the National Environmental Committee of Government of India with Dr. B.D. Nagchaudhri as the Chairman when Professor Dhar, Dr. D.K. Biswas, Dr. Ashok Khosla, Mr. N.R. Krishnan, Dr. Manju Sharma all worked together in the DST, and later contributed to our efforts for the spread of environmental education and policies in the country.

The seminar papers have been written by eminent scholars. They cover a wide range of subjects relating to environments. Prof. D.P. Zutshi has been the Head of Department of Environment in Kashmir University, as also a Fellow of National Science Akademies and is currently a JNU Professor. His paper on Dal Lake calls for

conservation of this precious gift of nature to Kashmir. Dr. S. Bhowmik, an Additional Director in the MOEF, Government of India has made extensive research work for hydroelectric projects in Kashmir. His paper has implications for generation of new energy resources. Dr. Iqbal Malik refers to management of solid waste which is a subject of considerable interest in Srinagar and other towns of Kashmir. Garbage disposal is important for the health and cleanliness of cities, as also for production of new energy resources and recycling of resources. Her paper was read by Dr. (Mrs.) Krishna Bhatt who is herself an environmental scholar and a retired Reader in Chemistry from Delhi University. Prof. P.S. Ramakrishna and Professor K.G. Saxena from the School of Environmental Sciences, Jawaharlal Nehru University and their colleagues discussed the entire philosophy of natural resource management for sustainable mountain development. Both the JNU Professors are world-known authorities in biosphere reserves used for sustainable development. Professor Saxena who read the seminar paper suggested that Kashmir should have new biosphere reserves for development. Pahalgam and Gulmarg areas have been considered in this respect. This paper has important perspective for the overall natural resource management and for preserving biodiversity. Mr. S.D. Swatantra, the Chairman of State Pollution Control Board, referred to soil and water conservation issues. He also said that there was an increase in the forest cover in Kashmir in recent period, as confirmed by satellite pictures. Mr. Swatantra made an overall assessment of pollution control measures being taken in Jammu and Kashmir State. Dr. A.J. James has made an analysis of water resource management. The author is an economist of repute and a Ph.D. in Economics from London. He pointed out that the demand for water is increasing. Therefore an action oriented planning is needed for long-term use of this vital resource. Professor B.B. Dhar has provided an overview of landmark decisions taken by the Government of India and laws made for environment protection in India. Professor Dhar has a lot of interaction with environmental sciences having been a Professor of Mining Engineering in BHU, and Director of Dhanbad Institute for Mining Engineering, Government of India. Dr. Afzal Wani holds a creative academic position in the Indian Law Institute, New Delhi and comes from a village in Kashmir. His paper on degeneration of environment in the countryside of Kashmir is of much interest. To protect the natural environments from unplanned growth and by proper enforcement of laws is

necessary. The present writer has in his paper in Chapter 9 referred to some major environmental issues in Kashmir. These relate to pollution of air, water and degradation of land areas. Many natural lakes have to be protected. Mountain ecology needs protection by environment impact assessment. Professor M.L. Wali, a long time academic member of Kashmir University makes a crucial assessment of environment education that needs to be spread in schools and colleges. The Supreme Court has also in a recent judgment on 18th December, 2003 (Hindustan Times, 19th December, 2003) called upon all States to introduce from 2004 environment education in schools and colleges as a compulsory subject. While in Kashmir in June 2003, I had discussions with Dr. S.G. Sarwar, Principal of S.P. College, where a postgraduate department of environment exists. Dr. Sarwar was keen that the State Government in Kashmir should introduce environment education in schools and colleges and S.P. College will provide ample support for training of teachers. The Supreme Court judgment has been made at an appropriate time when compulsory environment education is needed urgently to create environmental awareness in the country.

Presentation of papers continued in Part II during post-lunch session. Mr. P.N. Kachru has an in-depth article on the problems of Dal Lake. Kachru is also an eminent artist of Kashmir. His views on environment management are reflections of a landscape designer of nature. Nature can be designed as well, from an artist point of view. In the West, natural landscape has been improved by human ingenuity. In Chapter 12 Mr. S.N. Pandita has made a survey of environmental hazards and dangers faced in the history of Kashmir. Floods, fires, earthquakes confront man with challenges to environments. There is need to plan to control floods, forest fires and, create such institutions which meet with these challenges. Response to damages caused by earthquake is needed urgently in Kashmir. To predict above environmental hazards is also required for timely response. An agency for environmental hazards may be created to meet all exigencies. Mr. T.N. Dhar Kundan is a renowned poet and scholar on Vedic history. He has given some perspectives on environmental matters contained in Atharva Veda. Ancient people used to worship environments. Rabindranath Tagore says that in ancient India man lived in forests and had harmony with the environments. He was in spiritual union with nature. Modern man is trying to learn these secrets to establish ecological balance. More

study is needed of Vedas to understand nature and draw a balance between modern science and mysteries of nature. Even Einstein has said that the fairest thing is the mysterious; it is the cradle of true art and true science. Ms. Nahida Assad Basu, a younger scholar from Kashmir Valley has made an extensive study of Wular lake environments. Her paper was read out by Dr. Hasina Hashia, Associate Professor in Jamia Milia Islamia, New Delhi. She discusses Wular lake's ecological system, and economic and tourist potential. She has provided a historical background of various shrines situated on the lake and outside it. This article is certainly very scholarly and full of ideas on Wular lake. This lake has not involved enough attention by writers and researchers compared to Dal Lake. Ms. Basu needs to be complimented for this superb piece of literature on the Wular lake. This lake will provide immense benefit once its tourist and economic potential is fully utilized. Bandipore, the historical town is situated on the bank of Wular lake. Many routes to Central Asia used to start from Bandipore. In Chapter 15 a renowned contemporary poet of Kashmir, Mohamad Yusuf Adil, writes on the tragedy of Kashmir environments. He brings out the neglect of environmental concerns by people. We hope that the poet will raise the conscience of all to safeguard the environments. Barbara Ward and Rene Dubos wrote the book *Only One Earth* which was the report to United Nations Conference on Environment, 1972. The care and proper maintenance of this small planet earth was brought out so vividly in the above book. Arnold Toynbee, the historian-philosopher, wrote towards the end of his career a book on *Mother Earth*. Our worthy poet from Kashmir, Adil, therefore, is concerned to inspire all people to look to Mother Earth with greater care and less greed. In Chapter 16, I have written about the major trends in the global environment movement towards harmony with nature, a new dialogue on the unity of science and the unity in diversity of nature. Today all environmental planning world over is based on the overall unity in diversity of nature. This provides a new message to mankind, that is, to understand the merits of diversity of cultures in an overall unity of global multi-cultural heritage. This view is opposed to the conflicts based on differences in cultures and civilizations. There is currently only one civilization in the world based on the variety of cultures with overall unity in their diversity. This analogy is in fact based on the nature's unity in diversity of global ecology. There is order in the irreversible systems. Nature has its own ordering system, says Noble Laureate Professor Iliya Prigogine

in his book *Order Out of Chaos*. World is one large ecological unit. Similarly mankind is one large multi-cultural unit. We belong to one species—*Homo sapiens*. Margaret Mead, the anthropologist says that mankind is one hominid species on this planet “with many variations in climatic and breeding conditions, but still essentially one species exhibiting complete intra species fertility and hybridization between varieties as a source of strength.” Thus variety of cultures is a basis for the variety of global life and adventure. It should be a source of joy, as is being discovered in parts of world. India does offer a variety of cultures in harmony; many other countries see India as a role model for collective life.

In Chapter 17 we have reference by Dr. Ravindra Kaul to the social conflict created by militancy in Kashmir that has driven a large number of Kashmiri Hindus out of the State. The social environments must adjust to these hazards and turmoils and protect the life and living of all sections of populations. In Chapter 18 Mr. A.R. Wani, a distinguished scholar and administrator of Kashmir shares his experiences in biodiversity and environmental concerns. He is the former Principal Conservator of Forests and has many ideas concerning the ecology of Kashmir valley. He is associated with the newly established Ecological Council of Kashmir which is chaired by Professor Saifud-din Soz who is also the Chairman of Indian Parliamentary Committee on environment management. A citizens forum in Kashmir can perform a lot of creative work by harnessing the efforts of experienced citizens like Professor Soz, Mr. A.R. Wani and others. Dr. Sidharth Kaul writes on conservation of wetlands in India. He is a leading expert in the MOEF on this subject which is of concern to Kashmir in particular. Conservation of wetlands is of concern world over as a natural heritage of mankind. Wetlands are also abode of a wide variety of birds and other species of plants and animals. They help in protection of biodiversity of many species. The problems associated with lakes in Kashmir are to be seen in a wider perspective therefore, and not only as a source of human habitation and revenues. Mr. D.N. Munshi has explained in-depth some of the issues of environmental degradation in Kashmir in chapter 20. He has lived in Kashmir and has first hand information of changes in environments there during past fifty years. He is also a social scientist and a commentator on the shape of things in Kashmir. He was formerly the President of All India Kashmiri Samaj and commands a lot of respect in Indian and Kashmiri society. Mr. Munshi has also

written a couple of poems (*see* chapters 23, 24), that should inspire all and create love and care for the environment of Kashmir. He is a poet of nature. Mrs. Chandrakanta Veshin has written Chapter 21. She is a leading Hindi poet of Kashmir, sometimes compared with the likes of V.S. Naipaul, the Noble-laureate. She is a prolific writer and highly respected among Kashmiri intellectuals. Her father Mr. Ram Chand Pandita was the Principal of S.P. College, and an erudite scholar of Kashmir of his times. He was a great teacher too. He has a place in the academic history of Kashmir. Chandrakanta is therefore a versatile genius. Her views on environment and social history of Kashmir are most welcome for the people of Kashmir. Above all, she has lots of affection for the ecology and people of Kashmir. We need poets like Chandrakanta, Adil and Mehjoor and Munshi to inspire us once again in order to recover our lost glory of harmony and beauty of Kashmir. In Chapter 22 yet another young scholar of Kashmir, Dr. Mohd. Ayub Dar, writes about the social and environmental order in Kashmir and about the environmental laws. He has profound knowledge about the environments of Kashmir. He recommends that environmental laws be updated in Kashmir. His chapter is very erudite and carries a lot of useful information for environmental planning in Kashmir. I had met this young scholar in Kashmir University along with Professor Abdul Salam Bhat, the Dean of Academic Studies, who has been guiding him in legal research works. Dr. Dar appeared very scholarly and a committed researcher.

Towards the end of seminar a few scholars spoke in an open session providing their worthy opinions about the management of environments in Kashmir, and about shaping a bright new future in their motherland. Some of these scholars hail from Kashmir, and have had their education in schools and colleges in Kashmir. They expressed their nostalgic memories of the days gone by and the social harmony of their childhood days in Kashmir. These scholars included Mr. P.N.K. Jalali, Prof. M.L. Pandit (a Professor of English in Kashmir University), Mr. Vijay Raina etc. Dr. Arshi Khan from Hamdard University also spoke on human rights and environments. Dr. Khan is an inspiring young scholar from this university who provides ideas at the national level. The seminar ended with a vote of thanks by Mr. M.K. Kaw, the Chairman for the seminar. Mr. Kaw thanked all participants of the seminar for their concern for Kashmir environments, and for the scholarly discussions during the seminar.

He hoped that the proceedings will be read with much interest in India especially by the people of Kashmir, and in many parts of the world. He thanked the organizers for making excellent arrangements and the Convenor of seminar Prof. S. Bhatt. for conceiving this overall seminar project on environments of Kashmir. Apart from distinguished gathering in the seminar, many more scholars from Kashmir could not attend the seminar due to unavoidable engagements. These included Professor K.K.S. Jamwal, Dean of Sciences, Kashmir University, Dr. Azra Kamli, Professor Iqbal Qadri, Dr. A.M. Shah, Dr. G.A. Bhat, Professor A.R. Yusaf from Department of Environmental Sciences, Kashmir University, Dr. S.G. Sarwar, Principal S.P. College, Srinagar, Prof. Abdul Salam Bhat, Dean of Studies, and Prof. Jalees Ahmed, Vice-Chancellor, Kashmir University, Mr. Pradipto Ghosh, Secretary Environment, Government of India, Prof. Amitabh Mattoo, Vice-Chancellor, Jammu University, Prof. U.R. Rao, former Chairman ISRO, Professor M.G.K. Menon, Chairman, I.I.T. Delhi, Mr. T.R. Balu, Minister of Environment, Government of India, Dr. Karan Singh, and Prof. S.P.S. Dutta, Head of the Department of Environment, Jammu University.

Recommendations of Seminar

The participants made the following recommendations for the seminar:

1. Prof. K.G. Saxena from Jawaharlal Nehru University, School of Environmental Sciences suggested that consideration should be given to create some biosphere reserves in Kashmir. This will help research in environment protection and sustainable development.
2. Prof. S. Bhatt, Honorary Professor, Jawaharlal Nehru University suggested establishment of a Centre for Environment Education, perhaps in S.P. College which has a central location and already conducts postgraduate classes in environmental sciences. The Supreme Court decision of 18 December 2003 has made it necessary to start compulsory environment education in schools and colleges in India from 2004.
3. The forest cover should be increased as suggested by Mr. A.R. Wani, IFS retired.
4. Mr. M.K. Kaw has suggested that Kashmir Government may make a comparable study of forest and land management in Himachal Pradesh, and benefit from experiences of that State.

5. Ms Nahida Assad Basu has brought forth the need to have a eco-development project for Wular Lake in order to revive its economic and tourism potential.
6. Prof. M. Afzal Wani from Indian Law Institute has recommended that environmental officers be trained and posted in the villages of Kashmir, to provide immediate assistance to local administration and panchayats in environmental matters.
7. Dr. Mohd. Ayub Dar has recommended strongly that there be a review of environmental laws in the State keeping in view developments in other States in India and Central laws on environment management.
8. Dr. Iqbal Malik has recommended that garbage disposal in Srinagar and other towns of Kashmir be given a new direction based on experiences in Delhi etc.
9. Prof. S. Bhatt and Dr. Mohd. Ayub Dar suggest that air pollution by vehicles be controlled in Srinagar city and outskirts by enforcement of new air pollution control laws such as in Doon Valley and elsewhere.
10. Many participants recommended that a new water policy be made in Jammu and Kashmir State which takes an integrated view of all water resources available, and needs of water for various uses and its conservation.

5. Mr. Nabil Asad Khan has brought forth the need to have a well-developed project for Water Law in order to cover the economic and social aspects.
6. Prof. M. Azzam Wael has a Water Law Institute based in Egypt. He has a number of projects in the field of water law and policy. He is a member of the National Council of Universities and has been in charge of the water law and policy in the past. He is also a member of the National Council of Universities and has been in charge of the water law and policy in the past.
7. Dr. M. Abd. Aziz has a project in the field of water law and policy. He is a member of the National Council of Universities and has been in charge of the water law and policy in the past.
8. Dr. Adel Malik has a project in the field of water law and policy. He is a member of the National Council of Universities and has been in charge of the water law and policy in the past.
9. Prof. S. Hammad and Dr. M. Abd. Aziz have suggested a project in the field of water law and policy. They are members of the National Council of Universities and have been in charge of the water law and policy in the past.
10. Many participants recommended that a new water policy be made in Jordan and Kuwait since which cases are suggested. A view of all water resources and their use should be considered. Various uses and its conservation should be taken into account.

1. Prof. S. Hammad, Chairman, National Water University, School of Water and Environmental Engineering, Amman, Jordan.
2. Prof. S. Hammad, Honorary Professor, National Water University, School of Water and Environmental Engineering, Amman, Jordan.
3. Prof. S. Hammad, Honorary Professor, National Water University, School of Water and Environmental Engineering, Amman, Jordan.
4. Prof. S. Hammad, Honorary Professor, National Water University, School of Water and Environmental Engineering, Amman, Jordan.

Appendix I

List of Seminars held by KECSS and Books Published in Recent Years (in reverse order)

1. Seminar on "Kashmir Ecology and Environment : New Concerns and Strategies", an ICSSR project. Seminar held on 8 November, 2003 by KECSS, Kashmir University and other eminent scholars from JNU, Jamia Milia, Delhi University, etc. Prof. S. Bhatt was the Convenor. Proceedings published in February 2004. APH Publishing Corporation, 5 Ansari Road, Daryaganj, New Delhi.
2. Seminar on "Kashmir Saints and Sages and Social Harmony", held on 20 April, 2003, An ICSSR Project, Mr. T. N. Dhar Kundan, Convenor, Proceedings published 2004, APH Publishing Corporation, New Delhi.
3. Seminar on "Role of Kashmiri Women in Modern Society", held on 12.1.2003 Dr. Sushila Bhan, Convenor. Proceedings to be published.
4. Seminar on "Science and Synthesis, and Kashmir Heritage", held on 7.4.2002, Convenor Prof. Sudhir Sopori, Proceedings published 2004. APH Publishing Corporation, New Delhi.
5. Seminar on "An Anthropological Study of Kashmiri Pandits in NCR Delhi", held on 22.4.2001, Editors, Mr. T. N. Pandit and Prof. M.L. Pandit. Proceedings to be published by APH Publishers, shortly.
6. Seminar on "Kashmir Literature, Language and Culture", held on 7-8 January, 2001 in collaboration with National Centre for Languages, Patiala. Proceedings in press. Dr. Roop Krishen Bhatt, Convenor/Editor.
7. Seminar on "Remembering Lal Ded in Modern Times", held on 12.11.2000. Proceedings published in 2002, APH Publishing Corporation, New Delhi, edited by Dr. S.S. Toshkhani, eminent educationist of Kashmir. Book-review in *DAWN* newspaper, Karachi, Pakistan, attached as appendix II.

8. Seminar on "Kashmiri Pandits: Looking to the Future", held on 12.3.2000. Proceedings published in 2001. APH Publishing Corporation, New Delhi.
9. An international project - a book edited by KECSS with Mr. M. K. Kaw as the editor on "Kashmir and Its People: The Evolution of Kashmiri Society". Book published, 2004. An ICSSR project. APH Publishing Corporation, New Delhi.

List of Seminars held by KECSS and Books Published in Recent Years (in reverse order)

1. Seminar on "Kashmir Ecology and Environment: New Concepts and Strategies", an ICSSR project seminar held on 8 November, 2003 by KECSS, Kashmir University and other eminent scholars from JNU, Jammu and Delhi University. In February 2004 APH Publishing Corporation, New Delhi. Road, New Delhi.
2. Seminar on "Kashmiri Saints and Sages and Social Harmony", held on 30 April 2003. An ICSSR Project, Mr. T. N. Khan, Kashmiri Convention, Proceedings published 2004. APH Publishing Corporation, New Delhi.
3. Seminar on "Role of Kashmiri Women in Modern Society", held on 12.1.2003 Dr. Suhela Bhan, Kashmiri Convention, Proceedings to be published.
4. Seminar on "Science and Synthesis, and Kashmiri Ecology", held on 7.1.2003, Kashmiri Convention, New Delhi. Published 2004. APH Publishing Corporation, New Delhi.
5. Seminar on "An Anthropological Study of Kashmiri Pandits in NCR Delhi", held on 22.1.2001, Editor, Mr. T. N. Khan and Prof. M. L. Pandit. Proceedings to be published by APH Publishing, New Delhi.
6. Seminar on "Kashmiri Literature, Language and Culture", held on 28 January, 2001 in collaboration with National Centre for Language, Pandit, Proceedings to be published by Kashmiri Convention, New Delhi.
7. Seminar on "Remembrance: Lal Ded in Modern Times", held on 12.11.2000, Proceedings published in 2001. APH Publishing Corporation, New Delhi, edited by Dr. S. S. Toshniwal, Kashmiri Convention, New Delhi. Book review in DAWN newspaper, Karachi, Pakistan, attached as appendix II.

Appendix II

VOICE OF PEACE IN KASHMIR

Lal Ded: The Great Kashmiri Saint-Poetess

Edited by Dr. S.S. Toshkhani

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Reviewed by Nur Ahmad Shah

Scholars and researchers have written reams about the male poet-saints of the India-Pakistan subcontinent. Very little information is available on the life and work of its women poet-saints. The prominent among them are Mahadevi, Karnataka (12th century); Lalleshwari, Srinagar (1320-1388); and Mirabai, Ajmer (1498-1546). They broke with social taboos, renounced their marital bonds — two of them Mahadevi and Mirabai were married to the rulers — lived unconventional lives, became God-intoxicated, and mingled freely with the male mendicants.

Lalleshwari or Lad Ded or simply Lalla was remembered a couple of years back in a day long National Seminar "Remembering Lad Ded in Modern Times", held under the auspices of the Kashmir Education Culture and Science Society in Delhi in November 2000. The participants included eminent scholars who exchanged an array of information about different aspects of her genius, poetry and personality. The proceedings of the seminar have now been compiled in the form of a book, *Lal Ded: The Great Kashmiri Saint-Poetess*.

The papers read in the seminar depicted Lal Ded as a woman, as a poet and as a saint with few peers. She was born and married into a high-caste Brahmin family near Srinagar. The marriage did not last because of her in-laws' ill-treatment and her own rebellious temperament. She was a gusty woman for her times. The shackles of a patriarchal society in which she lived did not keep her from thinking independently. She would not shy away from finding faults even in her Guru

Like Mahadevi, before her, Lalla was a devotee of Shiva. She found Him dwelling in herself. "I, Lalla," says she, "went out far in search of Shiva, the omnipresent Lord; after wandering, I, Lalla, found Him at last within my own self, abiding in His own house." To her eclectic turn of mind, all organized religions were loathsome.

She abhorred ritualistic religious ceremonies. She dismissed pilgrimages to holy places as "useless". "Pilgrim Sannyasi," she lamented, "goes from shrine to shrine expecting to meet Him who abides within oneself". Fasting, to her "serves no purpose; beads and rosaries are inure plaything." She castigated the practice of animal sacrifice offered to stone idols.

"This animal, the sheep" she says, "gives you wool to protect you from cold and cover your privacy, and for itself it subsists just on God-given grass and water. Who then has ordained you, Oh ignoramus Pandit, that you slaughter it to offer to a stone."

She preached harmony and tolerance between different religions and thus epitomized the woman saint Rabia's saying, "Love of God hath so absorbed me that neither love nor hate of any other thing remain in heart," Her poetry too, was catholic in its sweep and it conveyed a message of peace and harmony. She bemoaned people consumed with greed and avarice. In a beautiful verse she says.

I will weep and weep for you, my Soul,
The world has caught you in its spell,
Though you cling to them with the anchor of steel,
Not even the shadow of the things you love,
Will go with you when you are dead.

Some quarters claim that Lal Ded had embraced Islam and that she was named Bibi Lalla Arifa. Such impression might have been inspired by the fact she lived at the time when the Muslim influence in Kashmir was on the rise, and her ideas and ideals bore a close resemblances to sufi beliefs. In more than one paper read in the seminar the speakers repudiated her conversion.

Similar controversy existed about Kabir (1440-1518). After his death a dispute arose between his Muslim and Hindu followers whether his body be buried or cremated. In fact, for historic reasons and common cultural mores, the saints and sages in the subcontinent are revered equally by Hindus and Muslim. The reason is simple; it is the universality of their message. 'They served the people regardless of caste or creed and rose above the narrow confines of religion which a Sindhi sufi poet Sachal said famously "confuse people".

Lal Ded is regarded "the maker of modern Kashmiri language as well as literature". The beauty of her verses or Vaakhs lies in her usage of colloquial language and vocabulary of every day use, because of her close association with lowly people like carpenters, weavers, potters, shepherds, etc. rather than an elitist or scholarly phrase, word or metaphor. This made her a household name. Even today she is, "an integral part of the life and the lore of ever Kashmiri".

The speakers in the seminar stressed the importance of an authoritative compilation of Lal Ded's Vaakhs. The difficulty being encountered in this regard is the absence of authentic manuscript(s) of her verse which, before their publication, used to be transmitted from generation to generation by word of mouth at the risk of interpolations and linguistic changes. Some of the verse are rejected as spurious.

The organizers of the seminar have, by bringing out its proceedings enabled the readers even outside India, to get acquainted with Lalleshwari as a poet and as a spiritual figure. Her reaching deserve careful study and wide publicity as a voice of sanity when violences, terrorism and bellicosity stalk the land.

Source: DAWN, May 25, 2003

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